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THE OFFICIAL ATARI JOURNAL

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Programming With GEM

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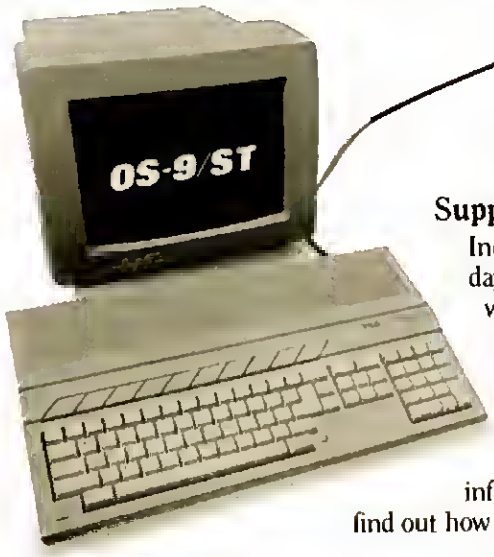

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Cover by David Ahl

The cover shows four of the steps involved in capturing an image and converting it to an animated computer image. The top frame is the video image itself. The next frame shows the raw image as captured by the Computer Eyes digitizer using 14 colors with a color separation setting of 5. In the third frame, using *NeoChrome*, the background has been painted light blue, and touch-up has been started around the head and shoulders of the figure on the right. The bottom frame shows the finished image. The two spare colors were used to add four additional balls (invisible in this frame) so that, using color cycling, the figures appear to be juggling. Various ways to animate images with color cycling are described in the article that begins on page 18.

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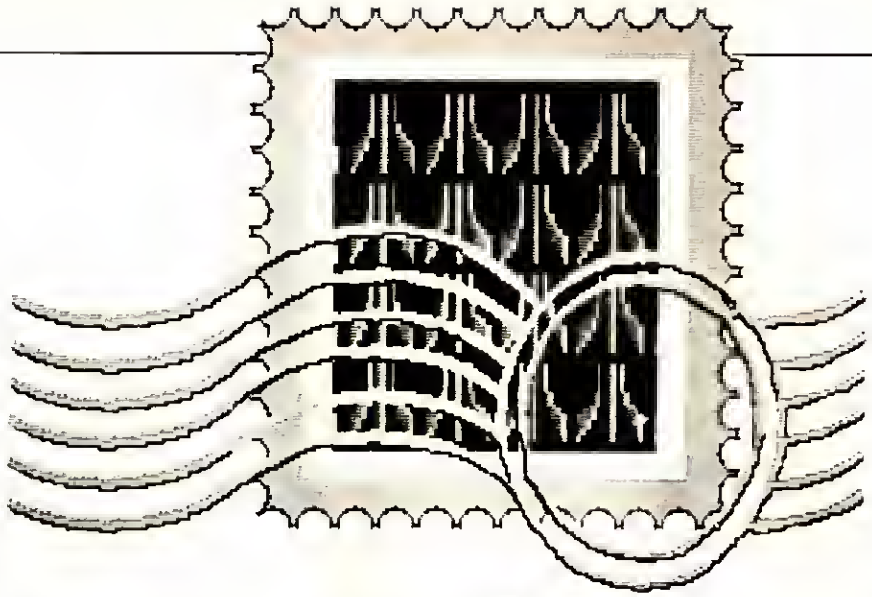

Letters To The Editor

Special Applications

Dear Editor:

I have tried several companies looking for a bowling secretary's program for the Atari 1040ST to no avail. Do you have any leads I might follow?

Bette Dufraine
96 School Rd.
Bolton, CT 06043

Dear Editor:

I have heard through various grapevines that there are information networks/magazines/professional journals/etc. for people with an interest in both the human sciences (pyschology, sociology, etc.) and computers. So far, I haven't found anything concrete like a name and address, though.

Do you or any of your readers know of such things? I woud be grateful for any information anyone could provide.

Doug Dobbs
7400 Artesia Blvd., #1205
Buena Park, CA 90621

We have checked our library and find no information with which to respond to either of these reqests. Perhaps our readers can help; if you know of a program or organization that will meet the needs described above, please let the writer know.

Eight-Bits Forever

Dear Editor:

I wish to applaud your editorial in the Summer 1987 issue of *Atari Explorer*. As the owner of an 8-bit machine, I can attest to the frustration of feeling very much left behind, yet finding my Atari 800XL to be just right for what I need.

I resist being forced into buying up—particularly at the expense of all those useful programs and all the data I have amassed for may present system. As you said, the 8-bits are great machines, and it is sad to see the shrinking number of store shelves devoted to 8-bit software as well as the declining number of magazine articles relating to the 8-bit machines—including *Atari Explorer*.

To have my frustration recognized is both appreciated and encouraging.

David R. Steindorf
5 Orchard Grove
Loudonville, NY 12211

While it cannot yet be said to have opened the flood gates of 8-bit submissions, our editorial has at least opened the tap. What was once a complete dearth of material has become a trickle, and you will see the best of it in upcoming issues. As for your dealer's shelves, we can only suggest again that you write to your favorite software publishers and remind them that you are waiting with wallet in hand for new 8-bit releases. And don't forget to patronize those companies that do produce the software you are looking for—and tell them you read Atari Explorer.

Through the Looking Glass

Dear Editor:

I am an avid Atarian and reader of the *Atari Explorer*. Each issue is highly informative and keeps Atari users in touch with the latest news, software, and technology.

I purchased my Atari 1040ST in August 1986 and have been enthusiastically working with it since. (By the way, her name is Alice.) I use Alice for varied applications such as word processing, 3-D graphic design, spreadsheet programs, database management, Basic programming, *Degas Elite* art works, and the occasional game.

The power of the ST computer coupled with its wide range of applications and potential applications still astounds me.

Keep up the good work; I am anxiously awaiting the next issue.

John E. Fournier
960 Senecal St.
Brossard, Quebec
Canada J4X 1L2

Thanks for the kind words. We're glad you enjoy your computer.

International Exchange

Dear Editor:

The French computer club, *Mémoire Vive* would like to contact an American or Canadian user group (at least one member would have to speak French).

Our club includes an Atari section, of course, and a (French) stamp collecting section. We meet once a month at the Blaise Pascal Technical School.

As a subscriber to your magazine, I am in a position to pass on to the club all the information you print. Your new programs reach us fairly quickly nowadays. French programmers are becoming very keen on the ST models, and their programs are excellent.

Mail should be sent to the head of each section at the address below.

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Gallium arsenide: Opening the gates

Technology

By DAVID H. AHL

After more than a decade as an experimental technology, gallium arsenide (GaAs) based digital circuits are beginning to reach the market in commercial quantities, particularly in the static RAM (random access memory) and gate array areas. While current GaAs designs remain roughly two generations behind the corresponding circuit designs in silicon and have inherently high cost, the demand for speed at any cost has stirred new interest in the technology, particularly in Japan and Europe.

What makes GaAs so interesting? Two things. First, it conducts electrons faster than silicon—about five times as fast when it is fabricated into a "standard" silicon-like semiconductor. However, electrons really pick up speed in GaAs devices 300 Angstroms or less in thickness.

Normally, when electrons shoot into the atomic latticework of a semiconductor, they run into trouble. Atoms are in constant motion, they aren't perfectly aligned, and there are atoms of impurities lying about. Thus, electrons quickly begin ricocheting off the atomic obstacles and slowing down.

In silicon, the average electron will travel only 100 Angstroms before it sideswipes some atomic obstacle and slows down. It will travel another 100 Angstroms, on the average, before hitting a second obstacle and losing more energy. The 100 Angstrom-distance is called the "mean free path."

A basic appeal of GaAs is that in it the mean free path is 1000 Angstroms, ten times that of silicon. Because they lose so much less energy, electrons can really zip through GaAs. About eight years ago, researchers at Cornell University's Submicron Lab theorized that if a semiconductor could be made thinner than its mean free path, electrons—dubbed ballistic electrons—could shoot through without hitting any atomic obstacles at all.

Physicists immediately began experiments to test the idea, and in July 1985, the phenomenon was observed in a supercooled 300-Angstrom thick layer of GaAs. In those early experiments, only about 30% of the electrons passed through unimpeded—too few to be of use. But now researchers are getting more than 75% to go through ballistically. About 90% would be enough for a commercial device, although engineers are shooting for 99%. At that level, gallium arsenide will be about 25 times faster than silicon!

Although GaAs will not replace CMOS (complementary metal oxide semiconductor, the basis for most high-performance silicon devices) in most applications, it will be successful in very high performance areas. After all, why should you pay a premium for speed you don't need? However, where speed is worth money, an increasing number of devices will be available, some of which were described at the recent International Solid State Circuits Conference in New York.

Under Development

N.V. Philips of Holland offered a paper detailing a 1K GaAs static RAM with a read/write cycle time of 2 nanoseconds (ns), output transition time of 200 picoseconds, and total power consumption of 210 milliwatts. Gate lengths range between 0.7 and 0.9 microns. These specifications are about five times better than the highest performance corresponding static RAM in silicon.

Hitachi presented a paper about its 1ns 4K static RAM, and Mitsubishi presented one on its 16K static RAM. Both devices use column-switched cell arrays to achieve fast fall and rise times and small delay times, which are necessary to make the actual access time in a computer approach the theoretical design speed. The Hitachi RAM, for example, has a maximum access time of 1.5ns.

A few U.S. companies are producing GaAs memories. Gigabit Logic of Newbury Park, CA, currently offers a 1K static RAM with a 1ns cycle time. A 4K version is due in early 1988.

Ford Microelectronics planned to introduce its 1ns, 1K static RAM in late 1986, but it was scrapped due to unsatisfactory yields and is now being redesigned. Several other companies produce GaAs devices for the military, among them Rockwell and Honeywell.

AT&T, which uses most of its GaAs products in-house, recently captured a $10.8 million DARPA (Defense Advanced Research Projects Agency) contract to construct a pilot line to manufacture high-end GaAs ICs for the military.

On the gate array front, Toshiba engineers described a 6K device with 6032 basic logic cells, 184 I/O buffer cells, and 204 pads. The circuit can be personalized as either a NOR or a two-input NAND gate. Among domestic companies, Gain Electronics of Branchburg, NJ, described a device with 3500 gates and 140 I/O ports operating with a power dissipation of less than 250 microwatts.

Honeywell introduced a somewhat smaller device with an 8-bit by 8-bit circuit with 1350 gates. On the other hand, Motorola said it has no current interest in GaAs, feeling that the existing technology is not cost effective when compared with silicon.

While gallium arsenide is not something that will be commonplace in personal computers for many years, it is inevitable that increasing research and development will drive down the cost and make the technology feasible for commercial high-performance applications by the early 1990s. ■

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Working at home: Computers make it possible and profitable

News and Views

By DAVID H. AHL

A recent study by Link Resources indicates that approximately 14 million Americans work at home and 7.5 million operate home-based businesses. In addition, employees of traditional companies who bring work home evenings and weekends number more than 8 million. In total, one or more people in over one quarter of the households in the country do work of some sort at home.

With numbers like these in mind, panelists—including manufacturers, mass merchandisers, and smaller retailers—at the recent Consumer Electronics Show (CES) indicated that they plan to place increased emphasis on products for the home office.

Panelists agreed that five categories of products would be most important in this market, because of both growing demand and falling prices: computers, copiers, electronic typewriters, facsimile machines, and full-feature telephones.

Atari's new president, Jerry Brown, said he believes optical scanners will have great impact on the home office market. "For $3500 to $4000, optical scanning and desktop publishing are possible in the home," he said. With such a capability, a small business can produce brochures, literature, and product documentation comparable to that produced by a multi-million dollar corporation and be highly effective in the market.

Mass merchandisers seem to feel that at this point no manufacturer is dominant in the market. Right now, only a few mass merchandisers, including Target and Caldor, carry computers, but others are expected to jump on the bandwagon before the year is out.

Random Bits

An investment group led by E.M. Warburg, Pincus & Co. agreed to buy from William H. Millard an 80% share of **Computerland Corp.**, the largest retailer of computers in the U.S. It is expected that the deal will amount to $200 million for the 80% share of the 800-store chain.

Panelists at the West Coast Computer Faire this spring agreed that **Pascal** is generally regarded as an educational language and will not be widely accepted—as was expected a few years ago—as an applications development language. Panelists agreed that developers will increasingly be using languages like C and Modula-2.

Games are back in vogue. After three years of declining sales, it appears as though computer games are on the comeback trail. Twice as much space at the Summer Consumer Electronics Show was devoted to games this year as in 1986, and many retailers are planning special promotions for the coming holiday season.

The five best selling games for the Atari this summer were *Flight Simulator II* (subLogic), *Hitchhiker's Guide to the Galaxy* (Infocom), *Chessmaster 2000* (Software Toolworks), *F-15 Strike Eagle* (MicroProse), and *Summer Games* (Epyx).

The hottest new games—as ranked by players—include *World Championship Karate* (Epyx), *Defender of the Crown* (Master Designer Software), *Harrier Strike Mission* (Miles Computing), *S.D.I.* (Master Designer Software), and *Ring Quest* (Origin Systems). Atari computer owners will be happy to note that most are available for their systems.

Although it was widely predicted that this year's **Spring Comdex** would be uneventful because of its overlap with CES and because many major vendors declined to exhibit, it turned out to be a great success. According to the Interface Group, sponsor of the show, more than 50,000 people attended, making it the largest Spring Comdex ever.

Vendors were pleased with the high percentage of large corporate users in attendance, which more than made up for a slight decline in attendance by retailers. Although relatively few new products were introduced, attendees felt the show had a level of excitement lacking in other recent trade shows.

As has been their practice the last two years, the FCC swooped down on computer hardware vendors at Comdex to determine if they were complying with **FCC radiation emission standards.** Jerry Freeman, coordinator of the FCC Computer Marketing Enforcement Program, said that although 60% of the machines surveyed did not meet FCC standards, the general level of compliance in the industry is improving compared to past years.

The FCC did not impound any equipment this year, but served notice on offending manufacturers that displaying or selling non-compliant devices would make them liable for fines of up to $2000 per day. The FCC said it takes approximately six weeks to certify a new device if the application is in order, although many vendors complain that in reality the process often takes substantially longer.

Cheaper talk. CompuServe reported that it reduced its daytime connect charges to the same level as its evening and weekend rates. Rates are now $6.00 per hour at 110 to 450 baud and $12.50 at 1200 to 2400 baud. Other surcharges and database access charges are unchanged.

Following on the success of the C-SPAN cable network, the California Utilities and Commerce Committee recently opened the **Capitol Connection**, a legislative policy electronic bulletin board for the state of California. The board allows residents to download information about committee activities and bills and upload their ideas and opinions. Use of the board is free except for the telephone call. To use the board, call (916) 442-0746 with a 1200 baud modem set to seven bits, even parity, and one stop bit, and leave your name and address. In return, you will receive a registration card and password.

More than 25 members of the Software Publishers Association (SPA) have joined forces to sponsor an extensive public awareness program, **Computer Learning Month**, scheduled for October 1987. Some of the projects of the program include producing a booklet, "What Every Parent Should Know About Educational Computing," distributing a colorful poster to schools and libraries, sponsoring contests, and placing articles and stories in newspapers and magazines. For more information, contact Katherine Borsecnik at the SPA, 1101 Connecticut Ave., N.W., Suite 901, Washington, DC 20036. ■

Inside Atari

By MARK JANSEN

For the past year, in cities and towns across the country, capacity crowds of developers, dealers, users, and potential users have gathered at regional Atari Expos. Objective: to enjoy a few days of fun and frolic under the Atari banner, to exercise their Constitutionally-guaranteed right of free assembly, and to get a good discount on smoked-Lucite disk boxes (going fast!).

The smell of the crowd, the roar of the greasepaint, the sound of crying children in styrofoam Atari Safari pith helmets forming counterpoint to the constant beat of music from the Hybrid Arts booth—these are the aspects of an Atari Expo that any attendee will find familiar. Behind the seenes, however, it's another story.

Hip-deep in plastic popcorn and yellow packing slips, Atari staffers, exhibitors, and user group members work hard at the shows—setting up and manning the exhibits, answering questions, and making sure everybody has a good time. But before any of this can start, the exhibition staff and equipment must find their way to the show site.

The Rules of Travel

As an Atari technical specialist on the show circuit, I have been to most of the Atari Expos, from St. Louis to Pittsburgh. Now I'm an old hand (in fact, prematurely aged)—but when the shows began last year I didn't know much about business travel. Fortunately, Neil Harris, Atari's director of marketing communications, was willing to share with me his Fundamental Rules of Travel.

Rule 1: *When packing, you don't need it.* Eliminate nonessentials. Do you really need 50 extra purple striped ties and a fright wig? Probably not. (Unless you're going to a show in Denver. Don't ask.) In addition to keeping baggage to a minimum, extra benefits can accrue from careful application of this rule. Do you really have room for that report you are supposed to be writing? Not if it means you have to leave the ties and the fright wig behind. Establish your priorities.

Rule 2: Same as rule 1, but for semitrailers instead of hand baggage. Atari has a trailer, which carries the desks, banners, hats, and other stuff we use at the Atari booth. The trailer travels overland from show to show, and we fly in to meet it. Before each show opens, we unpack the truck and set up our booth. At the end of each show, we pack the truck again and send it on its way.

Packing and unpacking a truck is a science—one that several of us Atarians have had to learn. Quickly. Without benefit of a lift. In the dark.

It has been my experience that people who have forklifts frequently forget that not everyone has a forklift at his disposal. Unpacking a truck that has been loaded with forklift is a broadening experience—one that gives you a new respect for human capabilities and a new and intimate understanding of human limitations. For example, I can say with certainty that a pallet loaded with monitors is too heavy for one human being to lift. Trust me.

Packing a truck, particularly in the dark, can also put a strain on human ingenuity. The packing process involves stacking things in such a way that they won't shift when the truck is in motion. Cary Gee, Dave Staugas, and I became virtual artists at truck-packing one dark night of the soul after all the other exhibitors at the Allentown Expo had loaded their booths into their station wagons and headed for home.

We were hardly fazed when we discovered that our trailer had no lights inside. Light? Who needs light to shift eight-foot stacks of heavy, highly breakable objects around in a space the size of a small airliner?

Confidence began to flag only later, when we discovered that there was no way of securing loose objects in the front of the truck. This meant that if there was any space left at the back of the truck, stuff would fall into it. Hard. And break. And probably be deducted from our next paycheck.

Our solution was to look at the truck and its contents as an enormous jigsaw puzzle, locking the contents of the truck into a unified mass not unlike a mortarless Roman arch. "Gimme something about the size of an SF314. I have a gap here that looks just right. Now hand me one of those monitor cables. Okay . . . now at the count of three, stand back . . . way back!"

It may have looked strange, but everything we packed worked at the next show. Of course, Sandi Austin, Atari's user group coordinator, nearly went into cardiac arrest when she saw what we had done. "Trust me." I said.

Whining and Dining

Once the booth is set up, we usually take some of the Expo organizers and exhibitors out for a nice meal in one of the local restaurants. When searching for a place to eat, we follow Neil's third rule: *When in Rome, eat Italian food.*

In other words, eat something that is likely to be fresh/good in the area. Don't order seafood in a mountaintop restaurant at the end of a dirt road in a landlocked state several hundred miles from the nearest airport. Trust me.

Another of Neil's Rules of Travel: *Don't eat in anything that calls itself a "Family Restaurant."* If its only claim to fame is that families are allowed to eat there, it's time to worry.

My own most important rule of eating at an Atari Expo is: *Don't sit near a guy in a moose hat unless you want a lapful of croutons.* Don't ask, just trust me.

Aside from usually having croutons in my lap, I'm easy to spot at the dinner table because I'm usually carrying one or more pieces of "classified" demonstration equipment. Believe me, there are more exciting dinner dates than a 1040ST equipped with a prototype blitter chip.

The worst part of eating out in an unfamiliar place is often finding the place. Directions from local residents

are not always helpful: "Go down until you see the brown building, I forget what the name of it is, then turn right, until you see the blue Ford parked in the driveway, and then turn left and follow the ruts 'bout a half a mile. You can't miss it. Trust me."

Sometimes, of course, the natives aren't even this forthcoming. "Hmmm . . . I don't know if you can get there from here. Least ways I never heard of anybody going there from here. Somebody say you could get there from here? Because you can't. Trust me." The moral? Buy a map.

On the Floor

Pre-show setup and feeding frenzy complete, we all wander off to our hotel rooms for a little sleep before the show begins. Usually there is a breakfast meeting the next morning to discuss the game plan for the upcoming day and to try to wake each other up. Then it's out to the show floor.

I have spent so many hours in the Atari booth that I can now answer most people's questions before they finish asking them:

"Um, about the new version of Neochrome . . . "

"Yes, it's out. $39.95 list price."

"Hey, thanks! Does it have . . . "

"Stretch and rotate? Yes."

"Gee, thanks!"

On the show floor, drifting from booth to booth, you see interesting products of all sorts for Atari computers, and they're often displayed by interesting people. From the keyboardist for the Pointer Sisters to a certain senior technical editor with a balloon tied to his glasses ("I'm beginning to feel lightheaded, Mark!") to a guy with a moose hat permanently attached to his head. I'm not sure it's worth explaining.

I have evolved another good rule of my own. *If you're going to be a speaker, change your name to something like Smith or Jones—or even Jansen.* Dave Staugas will never forget the trouble folks had announcing his seminars over the PA system at one recent Expo. The name is pronounced "staw-gus," but by the time the show closed on Sunday, Dave had counted around 80 new and interesting mispronunciations.

The Evening After

After a long day at a show, you have to decide what to do with your evening hours. Take the old blitter-enhanced ST out for a night on the town? Count and alphabetize the business cards you were handed today? What fun. Usually, however, in keeping with the party atmosphere of the Expo, somebody comes up with a scheme for having a good time.

One night, for example, I was sitting in my room thinking about how I was going to hate myself the next day if I didn't get some sleep, when I heard a knock on my door. Wondering who would be knocking at Question Mark's door at 1:00 in the morning, I looked out the peephole. A crowd of Atarians and exhibitors was huddled there, a bright light of madness in their eyes. Someone whispered "MidiMaze!"

If you haven't yet seen MidiMaze, imagine yourself as a smiley face wandering around in a maze. You get a rat's eye view of the maze on an ST screen. Now imagine a dozen other people, each at his own ST, each guiding his own smiley face through the same maze.

Now give each smiley face a gun and note that the original name of the game was Kill a Happy Face. Are you beginning to get the picture?

Their idea was simple: do whatever was necessary to get a game of MidiMaze going. Naturally, this made perfect sense to me. So, off we went to get a guard to open the exhibit area. And soon, there I was, on the other side of the country at 1:00 a.m. running through a maze and shooting at my friends.

And my boss. We have a very lateral and lenient hierarchy at Atari. However, it's always wise to remember the rule: *When playing MidiMaze, let your boss win.* Failing to do so could cause great career damage. Trust me. The game didn't break up until 4:00 a.m., and I'm still living down my victory.

So, what do I really think of the Atari Expos? They're a lot of fun. Trust me. ■

The sound of crying children

in styrofoam pith helmets forms a counterpoint to the constant beat of music from the Hybrid Arts booth.

By DAVID H. AHL

Our problems this month are rather interesting in that all of them can be solved in two ways—either by using one or more mathematical formulae or by writing a computer simulation. Because computer simulations are such powerful tools—often the only tools—for dealing with the complex problems of society, we recommend that you solve these problems by simulation.

Just what is a computer simulation? Consider this simple problem. A friend proposes this game: he will give you a penny for each play of the game, a "play" being flipping a coin three times. If the coins come up all heads or all tails, you must give him a nickel; otherwise you simply keep the penny. Is this a fair game?

Let's first solve the problem using mathematical formulae. The probability of a head coming up on any flip is $\frac{1}{2}$, and the chance of it coming up three times in a row is $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ or $\frac{1}{8}$, which can also be expressed as 0.125 or 12.5%.

The probability of flipping all tails is the same, so the chance of flipping all heads or all tails is simply the two probabilities added together, i.e., $\frac{2}{8}$ or $\frac{1}{4}$ or 25%. If you played the game 100 times, you would collect $1.00, but you would expect to pay off 25 times (25 × .05) or $1.25. Thus it is a good game for your

friend but not for you; in mathematical or real) terms, it is not a fair game.

To solve the problem using a computer simulation, we would have to write a short program. To flip the coin, we use the statement in Line 130. Remembering that the random number generator returns a number between 0 and 1, we multiply it by 2 and take the integer portion of the result; a 0 can then be thought to be a head, and a 1, a tail.

The loop in statements 120 to 150, flips the coin three times and adds the "value" of the three flips into T. If T is 0 (all heads) or 3 (all tails), then you must pay off.

```
110 T=0
120 FOR I=1 TO 3
130 F=INT(2*RND(1))
140 T=T+F
150 NEXT I
```

We can now add some statements to play the game P times (lines 80-100), receive a penny for each play (line 160), pay off for each all-head or all-tail result (lines 170, 190), and print the result (line 210). Our program now looks like this.

```
80 PRINT "HOW MANY PLAYS";
90 INPUT P
100 FOR N=1 TO P
110 T=0
120 FOR I=1 TO 3
130 F=INT(2*RND(1))
140 T=T+F
150 NEXT I
160 M=M+.01
170 IF T=0 OR T=3 THEN 190
180 GOTO 200
190 M=M-.05
200 NEXT N
210 PRINT "MONEY = ";M
```

If you "play" the game 100 times, don't expect to get an exact cost of 25 cents every time; in some cases you might actually come out ahead, while in others you could lose as much as 55 or 60 cents. However, if you play it a large number of times, you will find, on average, that you will have to pay off 25% of the time. You can easily add a few lines to your program to let it play a 100-flip game 1000 or even 10,000 times. If you want to watch the flipping of the coins and the totals on the screen, you can add the following two lines.

```
135 PRINT F;
155 PRINT T;" ";
```

There are many ways to make this program more efficient and more elegant. However, as it stands, it should give you a general idea of how to approach the problems below.

Answers are on page 41.

Family Planning

You and your spouse have decided that you want to have four children. What are the chances that all four children will be boys?

Birds Watching Birds

On a telephone wire between two telephone poles, 100 birds are perched at random intervals. If each bird watches its nearest neighbor, how many birds will remain unwatched?

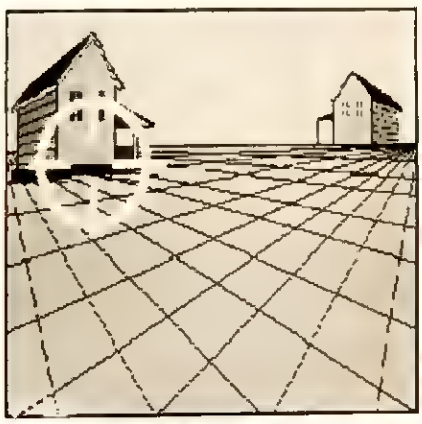
Bills in a Pocket

You are a vendor at a flea market selling toy robots for $5.00 each. A customer approaches and tells you that he has six bills in his pocket, a ten-dollar bill and five one-dollar bills. He offers to pay for a robot by letting you select—unseen— two of the bills at random from his pocket.

If all of your customers offer to pay for their robots in this unorthodox way, how would you expect to make out if you sold ten robots? If you sold 100 robots?

Baseball Cards

If a packet of bubblegum contains one baseball card and there are 50 different cards in a set, how many packets of gum would you expect to have to buy to get an entire set of cards? If a set contained consisted of 200 cards, how many packets of gum would you have to buy?



The Vicious Neighbor Problem

This is a two-dimensional version of the bird watching problem, but it is considerably more difficult to solve. We strongly recommend writing a computer simulation rather than using rigorous mathematics to solve it.

If 1000 riflemen are distributed at random in a level one-mile square area and, at a signal, each one shoots and kills his nearest neighbor, how many riflemen will be left alive? The more general form of the problem places N riflemen on any rectangular plane area; expressed as a percentage, the answer will be the same in either case.

Hint: the distance between any two points on a plane is the square root of the absolute value of the difference between the x coordinates squared plus the absolute value of the difference between the y coordinates squared.

By ROXANE FARMANFARMAIAN

Homefront

Icebreaker Atari:

Press your computer into service

as an assistant host

at your next party

Entertaining. We've all been hosts; we've all been guests. That's one of the benefits of growing up, in fact. We've seen it all before—no need to worry whether the party we're giving is going to be a success. The guests come, they talk, they eat, they leave, and everybody's happy. Right? Well, if you're planning to throw a bash anytime soon, take this test . . . and see.

1. Who do you have coming over?

a) Office colleagues?

b) Neighbors and buddies?

c) Community friends working on a project?

d) Miscellaneous groups of people who don't know each other?

NAMETAG (8-Bit)

ATARI KEY

- Any Atari 8-bit home computer with disk drive
- Atari Basic
- Any standard printer capable of printing on labels
- Continuous-form labels and regular printer paper

2. If you answered a) Office colleagues, then is it safe to assume that they see you, and each other, every day? If they aren't all talked out, they'll talk shop all night—what else can you expect? How do you plan to, well, perk up the conversation?

3. If you answered b) Neighbors and buddies, then you can expect that because they probably see each other every day too, there won't be anything new to talk about. So how do you make it a party (besides the food), rather than another everyday gab session with the same old people talking about the same old things?

4. If c) Community group, then, at least the problem is not that they see each other every day. No. Rather, it's that they'll get all serious and worked up about the project and think about nothing else. Host with the most—what do you propose?

5. If you answered d) Miscellaneous groups, then it's clearest of all—you need an icebreaker, something, anything to talk about. You will also need nametags—memories are so bad after parties! So what's your plan?

The answer in all cases is, you guessed it, your Atari (with a little help from its printer). Host, icebreaker, center stage for amusement, and chatterbox, it will put words into your guests' mouths and bring out the very best in everyone.

You don't believe it? Type in the program in the listing. Load your printer with continuous-feed, pressure-sensitive labels, and answer the introductory prompts. Then stand back, and like all good impresarios, enjoy the show.

The program itself is very simple—it just prompts each guest with questions about name, profession, and personal interests, then composes a HELLO, MY NAME IS: label that incorporates all this information in an easy-to-read format. By doing this, however, the

```
10 DIM I$(1000),N$(50),P$(50),H$(50),L$(50),D$(50),D(2
,2),T$(2)
20 D(0,0)=60:D(0,1)=10:D(0,2)=2:D(1,0)=8:D(1,1)=20:O(1
,2)=35
30 OPEN #1,4,0,"K:":POKE 752,1
40 GOSUB 1000
50 PRINT "PRESS <RETURN> TO CREATE GUESTS.TXT"
60 PRINT "      OR ANY OTHER KEY TO EXIT."
70 GET #1,K:IF K<>155 THEN 920
80 GOSUB 1000
90 POSITION 11,5:PRINT "OPENING GUESTS.TXT"
100 TRAP 110:OPEN #2,8,0,"D:GUESTS.TXT":TRAP 40000:GOT
O 140
110 TRAP 40000:CLOSE #2:GOSUB 1000:POSITION 6,5:PRINT
"ERROR IN OPENING GUESTS.TXT"
120 POSITION 6,6:PRINT "PRESS ANY KEY TO TRY AGAIN.";
130 GET #1,K:GOTO 40
140 GOSUB 1000:PRINT "PRESS ANY KEY WHEN PRINTER IS RE
ADY.";
150 GET #1,K
160 TRAP 170:OPEN #3,8,0,"P:":TRAP 40000:GOTO 190
170 TRAP 40000:CLOSE #3:GOSUB 1000:PRINT "   PRINTER E
RROR. PRESS ANY KEY"
180 GET #1,K:GOTO 140
190 GOSUB 1000:PRINT "WIDTH:     HEIGHT:     SEPARATION
:"
200 POSITION 2,21:PRINT "ARROW KEYS MOVE CURSOR. <RETU
RN> TO"
210 PRINT "RUN OFF TEST LABELS. <ESC> TO GO ON."
220 FOR I=0 TO 2:POSITION O(1,I),5:PRINT O(0,I):NEXT I
230 P=0:Q=1:POSITION O(1,0),5:POKE 752,0:GOSUB 2000
240 W=O(0,0):H=O(0,1):S=O(0,2)
250 IF W>19 AND W<81 AND H>4 AND H<21 AND S>1 AND S<66
 THEN 280
260 GOSUB 1000:PRINT "ILLEGAL ENTRY. PRESS KEY TO CONT
INUE.";
270 GET #1,Z:GOTO 180
280 IF K=27 THEN 320
290 FOR I=1 TO 2:FOR J=1 TO H:FOR K=1 TO W
300 PRINT #3;"*";:NEXT K:PRINT #3:NEXT J
310 FOR Z=1 TO S:PRINT #3:NEXT Z:NEXT I:GOTO 190
320 GOSUB 1000:PRINT "OKAY. LEAVE EVERYTHING AS IT IS
AND"
330 PRINT "USHER IN THE GUESTS. WHEN THE PARTY"
340 PRINT "IS OVER, ENTER ";CHR$(34);"HOST WITH THE MO
ST";CHR$(34)
350 PRINT "      AT THE FIRST PROMPT TO END."
360 PRINT :PRINT :PRINT "       PRESS ANY KEY TO BEGIN
."
370 GET #1,K
380 GOSUB 1000:POKE 752,0
390 PRINT "WHAT'S YOUR NAME";
400 INPUT N$
410 IF N$="HOST WITH THE MOST" THEN 790
420 GOSUB 1000:PRINT "PLEASED YOU COULD MAKE IT":PRINT
 N$:PRINT
430 PRINT "WHAT'S YOUR LINE OF WORK?":PRINT "(I.E. YOU
'RE A ...)";
440 INPUT P$
450 GOSUB 1000:PRINT "SO, YOU'RE A ";P$;", EH?":PRINT
460 PRINT "HAVE ANY SPECIAL HOBBIES YOU ENJOY":PRINT "
IN YOUR FREE TIME";
470 INPUT H$
480 GOSUB 1000:PRINT "HMM ... INTERESTING. WHAT ABOUT"
490 PRINT "PERSONAL PREFERENCES? WHAT'S ONE"
500 PRINT "THING YOU REALLY LIKE";
510 INPUT L$
```

```
520 GOSUB 1000:PRINT "... AND WHAT ABOUT ONE THING YOU
"
530 PRINT "REALLY DISLIKE";:INPUT D$
540 GOSUB 1000:PRINT "GOOD TO KNOW YOU, ";N$;"."
550 PRINT :PRINT "WAIT A SECOND WHILE I MAKE SOME NOTE
S"
560 PRINT "HERE, AND GENERATE A NAME TAG."
570 PRINT #2;N$:PRINT #2;P$:PRINT #2;H$:PRINT #2;L$:PR
INT #2;D$
580 I$=""
590 I$="HI! MY NAME IS "
600 I$(LEN(I$)+1)=N$
610 I$(LEN(I$)+1)=". "
620 I$(LEN(I$)+1)="I'M A "
630 I$(LEN(I$)+1)=P$
640 I$(LEN(I$)+1)=" WHO ENJOYS "
650 I$(LEN(I$)+1)=H$
660 I$(LEN(I$)+1)=". I ALSO LIKE "
670 I$(LEN(I$)+1)=L$
680 I$(LEN(I$)+1)=" AND DISLIKE "
690 I$(LEN(I$)+1)=D$
700 I$(LEN(I$)+1)="."
710 LC=H
720 IF LEN(I$)<=W THEN PRINT #3;I$:LC=LC-1:GOTO 780
730 I=W
740 IF I$(I,I)<>" " THEN I=I-1:GOTO 740
750 PRINT #3;I$(1,I-1):I$=I$(I+1):LC=LC-1:IF LC=0 THEN
 GOSUB 3000:GOTO 710
760 GOTO 720
770 I=I-1:GOTO 750
780 IF LC>1 THEN FOR I=LC TO 1 STEP -1:PRINT #3:NEXT I
:GOSUB 3000
785 GOTO 380
790 CLOSE #2:GOSUB 1000:POKE 752,1:PRINT " CHANGE TO S
TANDARD PAPER AND PRESS"
800 PRINT "       ANY KEY FOR GUEST REPORT."
810 GET #1,K
820 OPEN #2,4,0,"D:GUESTS.TXT"
830 TRAP 910
840 INPUT #2;N$,P$,H$,L$,D$
850 PRINT #3;"NAME: ";N$
860 PRINT #3;"PROFESSION: ";P$
870 PRINT #3;"HOBBY: ";H$
880 PRINT #3;"LIKES: ";L$
890 PRINT #3;"DISLIKES: ";D$
900 PRINT #3:PRINT #3:GOTO 840
910 CLOSE #1:CLOSE #2:CLOSE #3
920 POKE 752,0:PRINT :END
1000 PRINT CHR$(125);
1010 POSITION 15,0:PRINT "*NAMETAG*":POSITION 2,5:RETU
RN
2000 PRINT CHR$(30);CHR$(31);
2010 GET #1,K
2020 IF K=27 OR K=155 THEN 2080
2030 IF K=30 THEN P=P-1+3*(P=0):POSITION D(1,P),5:Q=1:
GOTO 2000
2040 IF K=31 THEN P=P+1-3*(P=2):POSITION D(1,P),5:Q=1:
GOTO 2000
2050 IF K=126 AND Q>=2 THEN PRINT CHR$(K);:Q=Q-1:GOTO
2000
2060 IF (K<ASC("0") OR K>ASC("9")) AND K<>32 OR Q=3 TH
EN 2010
2070 PRINT CHR$(K);:Q=Q+1:GOTO 2010
2080 POKE 752,1:PRINT
2090 FOR I=0 TO 2:T$=""
2100 FOR J=0 TO 1
2110 Q=PEEK(88)+256*PEEK(89)+D(1,I)+J+5*40
2120 T$(J+1)=CHR$(PEEK(Q)+32)
2130 NEXT J:D(0,I)=VAL(T$):NEXT I
2140 RETURN
3000 FOR J=1 TO S:PRINT #3:NEXT J:RETURN
```

computer is performing an invaluable set of social services.

First of all, your Atari is a very democratic host: it treats every guest in exactly the same way, regardless of whether he or she is enjoying your hospitality for the first or 800th time. This kind of fairness is very difficult for even the most suave and practiced human host—and let's face it, these days, hosts are more likely to greet guests with a cheery "Hi! Get yourself a drink while I finish cooking," than they are to engage each new arrival in a long spate of introductory conversation.

Second, if early arrivals are pressed into service to assist and direct newcomers in using the computer, it provides a way for guests to become involved with one another right away. Moreover, if every guest is obliged to use the program immediately on arrival, all will have at least one recent experience in common—and this itself can facilitate conversation.

Third, by answering the computer's questions about profession and interests, guests are forced to consider how they wish to present themselves in the social forum you are providing.

Those who have brought the day's emotional baggage with them—along with their workaday persona—will be encouraged to discard it and present a more well-rounded view of themselves. Some will awaken to the opportunity of being able to present themselves in a new and interesting light (or perhaps a series of new and interesting lights as the evening progresses—guests can use the program more than once). You'll learn things about your friends you never knew before.

Your Atari is a very democratic host; it treats every guest in exactly the same way.

Lastly, the nametags the computer produces are practical aids to conversation. Because they incorporate so much personal information—about hobbies, political concerns, talents, etc.—strangers can use them to assess quickly

NAMETAG (ST)

ATARI KEY

- Any Atari ST computer
- ST Basic
- Any standard printer capable of printing on labels
- Continuous-form labels and regular printer paper

where common interests lie. The conversations that result are deeper and more rewarding than those obtained through the use of conventional social formulae.

It really works—I know, because I've tested it. At one recent party, the first people at the keyboard—the unfortunate guinea pigs—were very literal-minded. Like good school kids, a little nervous, they answered the questions, hit Return, and escaped.

Then someone who didn't type sat down. "Use a pencil, use your nose, peck away with your index finger any-

```
10    w=60:h=10:s=2
20    fullw 2
30    gosub 1000
40    print "      Press <RETURN> to create guests.txt
 or any other key to exit."
50    k=inp(2):if k<>13 then end
60    gosub 1000
70    gotoxy 25,6:print "Opening guests.txt ..."
80    on error goto 100
90    open "O",#1,"guests.txt":on error goto 0:goto 13
0
100   on error goto 0:gosub 1000:gotoxy 10,6
110   print "Error opening guests.txt. Press any key t
o continue."
120   k=inp(2):goto 30
130   gosub 1000:gotoxy 20,6:print "Press any key when
 printer is ready."
140   k=inp(2)
150   gosub 1000
160   print "Enter label width in characters or RETURN
 to use";w;
170   input z$:if len(z$)<>0 then w=val(z$):z$=""
180   print "Enter label height in lines or RETURN to
use";h;
190   input z$:if len(z$)<>0 then h=val(z$):z$=""
200   print "Enter number of lines separating labels o
r RETURN to use";s;
210   input z$:if len(z$)<>0 then s=val(z$):z$=""
220   if w>19 and w<81 and h>4 and h<21 and s>1 and s<
66 then 250
230   gosub 1000:print "Illegal value. Press key to co
ntinue."
240   k=inp(2):goto 150
250   gosub 1000:gotoxy 10,6
260   print "Press <RETURN> to run off test labels or
<ESC> to go on."
```

```
270   k=inp(2):if k<>13 and k<>27 then 270
280   if k=27 then 350
290   for i=1 to 2:for j=1 to h:for k=i to w
300   lprint "*";:next k:lprint:next j
310   for z=1 to s:lprint:next z:next i:gosub 1000:got
oxy 10,6
320   Print "Press <RETURN> to enter new values or <ES
C> to go on."
330   k=inp(2):if k<>13 and k<>27 then 330
340   if k=13 then 150
350   gosub 1000:gotoxy 10,6
360   print "Okay, leave everything as it is and usher
 in the guests."
370   gotoxy 13,7:print "When the party is over, enter
 HOST WITH THE MOST"
380   gotoxy 22,8:print "at the first prompt to end."
390   gotoxy 23,10:print "Press any key to begin."
400   k=inp(2)
410   gosub 1000:input "What's your name";n$
420   if n$="HOST WITH THE MOST" then 650
430   gosub 1000:print "Pleased you could make it, ";n
$;".":print
440   input "What's your line of work? (i.e., you're a
 ...)";p$
450   gosub 1000:print "So, you're a ";p$;", eh?":prin
t
460   print "Have any special hobby you enjoy"
470   input "in your free time";h$
480   gosub 1000:print "Hmmm ... interesting. What abo
ut personal"
490   input "preferences? What's one thing you really
like";l$
500   gosub 1000:input "And what about something you r
eally can't stand";d$
510   gosub 1000:print "Good to know you, ";n$;". Wait
 a second while I"
520   print "take down some notes and generate a name
tag."
530   print#1,n$:print#1,p$:print#1,h$:print#1,l$:prin
t#1,d$
540   i$="Hi, my name is "+n$+". I'm a "+p$+" who like
s "+h$+"."
550   i$=i$+" I also like "+l$+" and dislike "+d$+"."
560   lc=h
570   if len(i$)<=w then lprint i$:lc=lc-1:goto 630
580   i=w
590   if mid$(i$,i,1)<>" " then i=i-1:goto 590
600   lprint left$(i$,i-1):i$=right$(i$,len(i$)-i):lc=
lc-1
610   if lc=0 then gosub 2000:goto 560
620   goto 570
630   if lc>0 then for i=lc to 1 step -1:lprint:next i
:gosub 2000
640   goto 410
650   close 1:gosub 1000:gotoxy 16,6
660   print "Change to standard paper and press any ke
y"
670   gotoxy 26,7:print "for guest report."
680   k=inp(2)
690   open "I",#1,"guests.txt"
700   on error goto 780
710   input#1,n$,p$,h$,l$,d$
720   lprint "Name: ";n$
730   lprint "Profession: ";p$
740   lprint "Hobby: ";h$
750   lprint "Likes: ";l$
760   lprint "Dislikes: ";d$
770   lprint:lprint:goto 710
780   close 1:end
1000  clearw 2:gotoxy 30,0:print "$NAMETAG$":gotoxy 0,
6:return
2000  for j=1 to s:lprint:next j:return
```

Guests are forced to consider how they wish to present themselves in the social forum you are providing.

thing, but you have to do it," insisted the hostess. The guest protested, meekly, but the hostess stood firm. Finally, he began to type, as earlier arrivals stood around and egged him on.

That person's example opened the floodgates of human ingenuity. Thereafter, no one would be outdone. If a guest's first attempt turned out a boring nametag, a second chance at the machine was arranged (all the guinea pigs insisted on seconds).

It became a game to outfox the computer's literal-mindedness, "tricking" it into turning out odd phrases in strange and funny combinations. (And of course, it was the initial skeptics who proved the most adamant repeat-participants—which, right there, made my night.)

The Program

The Nametag program is provided in two versions—for Atari 8- and 16-bit computers with printer. After typing in the program and SAVEing it, load your printer with blank, continuous-form, pressure-sensitive labels (available from Quill Corporation, P.O. Box 4700, Lincolnshire, IL 60197; catalog #871-7-10744), and type RUN.

The program will start by opening a file called GUESTS.TXT on your disk. Then it will automatically print measure marks across and down your first few labels, ask you to count the marks and input the results so that it knows how big the labels are and how much space there is between them.

Thereafter, the program should happily churn out labels all evening—writing the dossier of each guest to disk in the process. At the end of the evening, you can type HOST WITH THE MOST (all caps) at the What is your name? prompt, and throw the program into report mode. Fill your printer with normal paper once again, and the computer will turn out a full report on who attended your party—useful for making up a list for your next on. ■

Repairs and replacements: What do I do if my Atari is broken?

Question Mark

By MARK JANSEN

Q: I have an Atari product that is still under the 90-day warranty, and it doesn't work. What can I do about exchanging it?

A: You should take the product back to the place of purchase for repair or exchange. Your dealer should be able to handle it with a minimum of fuss.

If you cannot get the unit repaired or replaced by the dealer and it is still under warranty, you can send it, along with a letter of explanation and a copy of your receipt, to Atari Corp., 390 Caribbean Dr., Sunnyvale, CA 94089, Attn: Door 17.

It will be repaired or replaced at Atari's discretion.

If you are unsure whether the unit is defective or not, you should contact Atari Customer Relations before sending it in, so they can help you determine the condition of the product. Sometimes the product is not defective, and the problem can be resolved over the phone. Customer Relations can be reached at (408) 745-2367 or 5759.

If the product you are returning is no longer manufactured or kept in stock by Atari and if replacement is indicated, Atari will replace your product with an equivalent or enhanced version, at our discretion. For example, a defective 800 series computer will typically be replaced with an 800XL.

If your unit has been modified in any way—as by the addition of chips, extra memory, etc.—please call Customer Relations for instructions.

Q: But what if my product is out of warranty?

A: In the case of an out-of-warranty item, you have two choices. You can either take the product to an Atari authorized service center, or you can send the unit directly to Atari. To get the names of service centers in your area, call Customer Relations at the numbers listed above.

If you cannot get the unit repaired locally, you can send it directly to Atari for repair or replacement. Send it to the address above, along with a letter of explanation and a check for the appropriate amount from the list in Table 1.

If the product you have is not listed here, or your unit has been modified in any way, please call Customer Relations for instructions. Note again that if your unit is no longer manufactured or kept in stock by Atari, we will replace it with an equivalent or enhanced version at our discretion.

Q: If I need a power supply, cable, joystick, etc., how can I get it?

A: Small items of the sort you mention are not exchanged, but replacements can be purchased. Table 2 lists current prices. Send a check or money order for the appropriate amount plus $2.50 per order for shipping to Atari Customer Relations, P.O. Box 61657, Sunnyvale, CA 94088.

If the item you need is not listed, you can call Customer Relations directly. ■

Table 1. Repair/replacement prices for Atari hardware.

Game Systems	
2600 Game System	$25.00
7800 Game System	$45.00
Eight-bit computer products	
XM301 Modem	$25.00
XMM801 Printer	$75.00
65XE Computer	$50.00
130XE Computer	$65.00
400 Computer	$35.00
600XL Computer	$35.00
800 Computer	$50.00
800XL Computer	$50.00
1200XL Computer	$50.00
810 Disk Drive	$75.00
825 Printer	$75.00
830 Modem	$20.00
850 Interface	$40.00
1020 Printer/Plotter	$30.00
1025 Printer	$75.00
1027 Printer	$75.00
1050 Disk Drive	$75.00
ST Computer Products	
520ST Computer	$95.00
ST Mouse	$20.00
SM124 Monochrome Monitor	$60.00
SF314 Oisk Orive	$90.00
SF354 Disk Drive	$75.00
SC1224 Color Monitor	$95.00
SMM804 Printer	$75.00
1040ST Computer	$125.00
SH204 Hard Disk	$225.00

Table 2. Atari Accessories Price List

Power Supplies	
CAO17964 (for 400/800/810/850/1050)	$19.95
CO61982 (for 600XL/800XL)	$19.95
CO61636 (for 1027 printer)	$34.95
CO70099 (for 520ST CPU)	$50.00
CO70091 (for ST disk drive)	$40.00
CX261 (for 2600 video game)	$6.95
CAO25492-001 (for 7800 video game)	$12.00
Switch Box	
CX282 (for 2600/7800/XL/XE)	$6.95
Controllers	
CX40 Joystick for 2600/XL/XE/ST	$6.95
CX30 2600 Paddle Controllers	$9.95
CX22 2600 Trakball	$14.95
CAO70025 ST Mouse	$50.00
Miscellaneous	
CO70284 SC1224 Monitor Cable	$16.00

STunning Animation With Color Effects

Use these easy techniques to animate your NeoChrome and Degas images

Norman emerged from the subway at the corner of 42nd Street and Avenue of the Americas and glanced up at the scrolling news sign to read, ATARI STOCK LEADS MARKET RALLY. Scores of colorful signs vied for his attention with spectacular animated images: a troop of high-kicking dancers, a sleek race car, an erupting volcano, an absolutely perfect surfing wave, the new James Bond (was he the 4th or 5th?) shooting some sort of futuristic weapon, and a magical endlessly-pouring champagne bottle. He thought to himself, "there ought to be some way of producing these effects on my Atari ST . . . ," but his train of thought was broken as his shoe became mired in a giant wad of bubble gum on the sidewalk.

Norman was right. These effects—and many others—can be produced on the Atari ST. A few paragraphs buried in the back (page 62) of the *NeoChrome* manual mention that you can create the effect of motion by using color ramping and color cycling. A brief description is provided, but it doesn't begin to give you a sense of all the possibilities.

In this article, we show you how to produce ten different motion effects using only the color cycling capability of *NeoChrome*:

- Flashing signs
- Jumping figures
- Moving signs
- Moving figures
- Color flow
- Scrolling
- Rotation
- Explosions
- Shooting
- Pouring and Flowing

The secret to producing several of these effects is to use foreground and background colors that are actually identical but occupy different positions along the color palette. When they are displayed on the screen, your eye cannot distinguish one color from the other, but

Figure 1a.

Figure 1b.

NeoChrome thinks of them as different and can change one while leaving the other alone.

Other effects are produced by letting different colors "follow" each other across, through, or around part of an image. The shape, arrangement, and spacing of these bands of color as well as the selection of colors themselves can produce several dramatically different effects.

Flashing Signs

The easiest effect to produce is a flashing sign. This technique will introduce you to the basic concept of visible and "invisible" colors. The flashing Hello sign in Figures 1a and 1b alternately lights the center of the letters and the outline around them. The bubbles around the sign also take turns being on and off.

To make your own sign, select text mode and use 28 point outline style text. Leave the background color (the leftmost color in the color selector palette) black (color 000). Type whatever message you wish in a bright color—yellow (770), for example.

If your message is short (like Hello), you may wish to use the copy box to expand the text (as we did). You can then use the shape mode with a wide border width to draw some circles in the area around the sign. Draw some of them in yellow and some of them in the color immediately to the left of yellow in the palette (orange, 750).

Next use the paint bucket to fill in with orange the centers of your yellow letters and circles. Then fill in the orange circles with yellow. The left color delimiter (the pointed block at the left of the color row next to black) should now be moved over the orange on the color palette.

To move the delimiter, point to it and hold the right mouse button while you drag the pointer to the desired location. Next move the right delimiter over yellow; the two delimiters (pointed blocks) should now be adjacent.

Now move the cursor over either of the color scroll arrows and click the right mouse button. The orange and yellow colors should cycle back and forth. You can stop the cycling by clicking on the opposite arrow with the left mouse button. This is the time, while both colors are visible, to make any small corrections on your image.

Now you are going to make the orange color "disappear." First, click the arrow under the orange in the color palette. Next to the color swatch (right side of screen) is a three-digit number repre-

By DAVID H. AHL

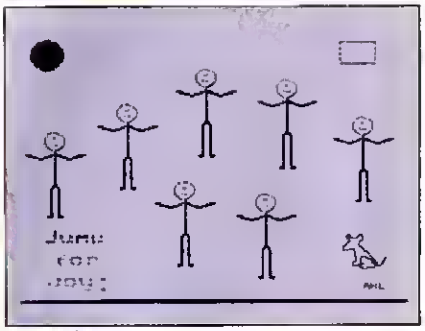


Figure 2a.

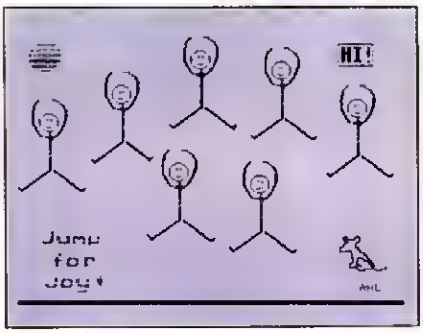


Figure 2b.

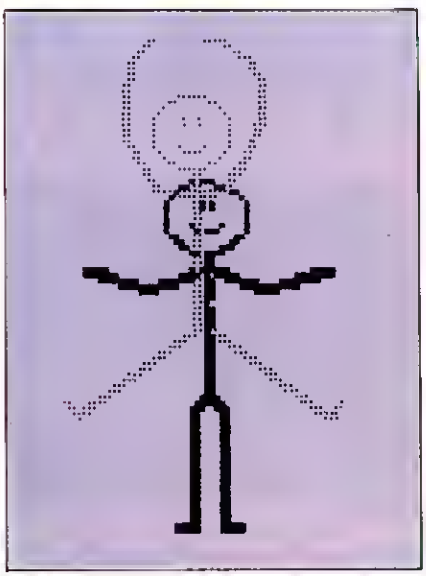


Figure 3.

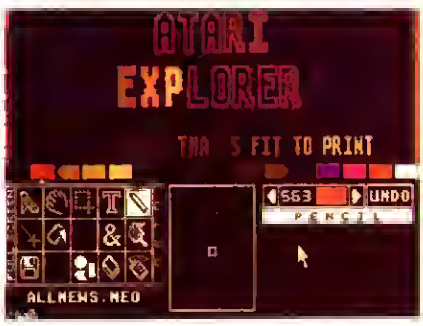


Figure 4.

senting the RGB value of the color in the color swatch box. By pointing to these digits and clicking either mouse button you can change the swatch color. Change it to color 000 (black), the same as the background color.

Next, point to the color swatch itself and double click the left mouse button to replace the orange in the color palette with black (000). Part of your image should now be invisible. Now, when you click the right mouse button over one of the color scroll arrows, your image should flash between the outline and the center fill. Voila—a flashing sign!

Jumping Figures

The technique used to produce jumping stick figures (Figures 2a and 2b) is nearly the same as for the flashing sign. Here, the background color is white (777), which must be loaded into the leftmost position in the color palette. Next, choose two contrasting colors to work with and put them next to each other in the color palette.

Don't, for example, try to work with two shades of blue. Good choices are pure red (007) and pure blue (700). Move the color delimiters over these two colors.

Use one color, say blue, to draw a standing figure. Next, use red to draw a jumping figure immediately next to the standing figure (see Figure 3). Because the two figures overlap, parts of one must necessarily cover parts of the other. By placing buttons or other decorative touchs at strategic places in the costume your figure is wearing, you can minimize the effect of this overlapping. Experiment with the overlap until you get an acceptable effect.

To make your figure jump, put color 777 (white) into the color swatch and double click it in place of one of your two colors. Now one of your stick figures should have faded into the background. Click the right mouse button over one of the color scroll arrows to make your figure do jumping jacks.

When you are satisfied with your jumping figure, you can use the copy box or jack knife to produce copies of your stick figure at other places around the screen. Don't forget to click the right mouse button before moving your image so the first one stays in place. It is probably easier to move the image if you can see both parts of it, so you may want to substitute red for the white stick figure during the copying operation.

Since your jumping figures use only two of the 15 colors available on the palette, you can use other colors to add elements to your picture. Our scene, for example, includes a sun at the top left and a sign at the lower left.

The technique for producing moving figures is nearly the same as that for making a moving sign.

Moving Signs

A small variation in the technique described above can be used to make the words or letters in a sign light up in sequence. To produce this effect, leave the background black and select text mode. Using the color immediately to the right in the color palette, type a word or two using 28 point outline style text.

Next, using the paint bucket, fill in the letters with successive colors along the color palette starting with the third from the left. When you have filled in all the letters, move the left color delimiter over the third color from the left and the right delimiter over the last color you used as a fill. Start the color cycling, and the letters of your sign will run through the colors of the rainbow.

To make your sign look as though the colors are moving from left to right, you may want to select one bright color, say yellow (770), and use color values between this color and black (000) in the delimited portion of the color palette. For example, the sign in Figure 4 cycles through nine colors in order—770, 660, 550, 440, 330, 220, 110, 001, 001.

This list of colors illustrates a very powerful concept, namely that two or more colors in your sign can be the same, yet *NeoChrome* will remember them as different colors as long as they occupy different positions in the color palette. If, for example, you want the outline of your letters to "disappear," you can change the outline color to black (000). Even though this is the same as the background color or one or more of the cycle colors, *NeoChrome* treats it as a different color.

Nearly the same technique is used to light up successive words in a sign. The only difference is that successive colors

Figure 5.

Figure 8.

Figure 6.

Figure 7.

in the palette are used to type each word. Because the paint bucket is not used to fill the centers of the letters, you do not have to use outline style and you can use any type size or style that you wish.

You must, however, click at the end of each word, change the color, and click where you want the next word to start. If you simply change the color, everything you have typed will change color.

Moving Figures

The technique for producing moving figures is nearly the same as that for making a moving sign. To make a stick figure run across the screen, for example, draw the figure in different running positions from left to right across the screen. Each figure should be drawn with a different color, moving from left to right along the palette.

Set the left delimiter to the color of the leftmost figure and the right delimiter one or two positions beyond the color of the rightmost figure. Change the background color to white (777), set the first delimited color to black (000) and all the other colors between the delimiters to white (777).

Start color cycling, and your figure will appear to run across the screen over and over again. A variation on this theme is shown in Figure 5 in which a stick figure runs around in a circle. Figure 5 shows all 13 figures, but in the animated version, only the two on opposite sides of the circle are left visible.

By the way, you can change the speed of the cycling by successively clicking the left mouse button over the left scroll arrow or the right mouse button over the right scroll arrow. In this way, you

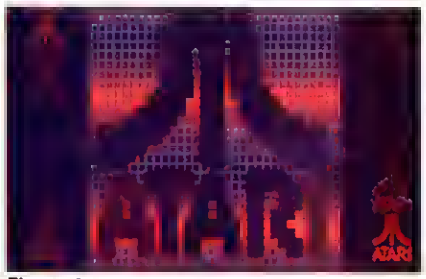


Figure 9a.

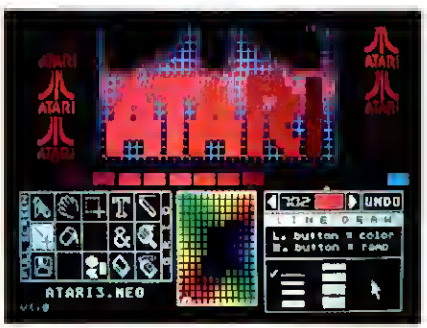


Figure 9b.

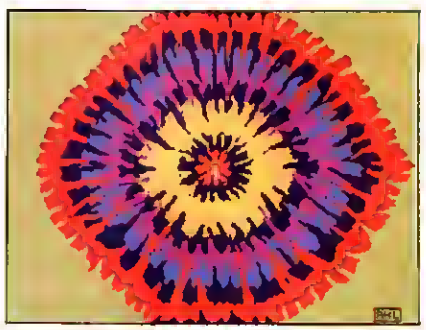


Figure 10.

Figure 11.

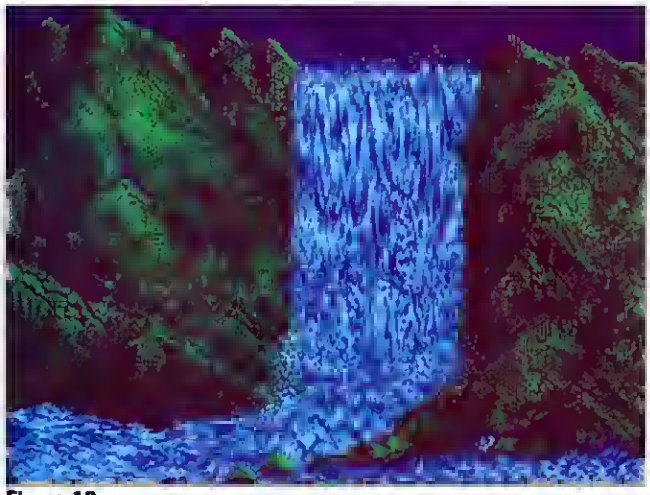


Figure 12.

can make your figure run very fast or agonizingly slowly.

Color Flow

Actually, you have already used color flow to make the moving signs and moving figures described above. In color flowing, all the colors are left visible, usually in the order in which they appear in the spectrum, to move from one part of the image to the next. Color flow is most effective if the elements of the image are adjacent to one another, rather than being separated by outlines or the background. Figures 6 and 7 demonstrate color flow.

In Figure 6, shape mode was used to draw overlapping filled (solid) circles, each one of which was drawn with a successive color along the color palette. The pipe, face, and text were added at the end using black and white—colors outside the range of the color delimiters. When color cycling is turned on, it appears as if the pipe is puffing out bubbles that become larger as they rise on the screen.

In Figure 7, successive colors along the palette were used to draw and fill in bands of color along a funnel starting at the top of the screen. When color cycling is turned on, the colors appear to "flow" from the top of the screen into a color wheel below.

Color Scrolling

Color scrolling is essentially the same as color flow except that it generally utilizes a large area of the screen, and the direction of the flow is usually from top to bottom or from left to right. The image titled "NeoChrome" (Figure 8) uses 11 colors between the delimiters to produce a scrolling effect in the 11 rows of paintbrushes from the top to the bottom of the screen.

In Figures 9a and 9b, the center grid and the six Atari symbols at both sides of the large central symbol use 14 relatively closely spaced colors from the red/violet end of the spectrum to produce a dramatic scrolling effect.

Simulation of the movement of liquid is the most difficult effect to produce, but it is extremely impressive when done well.

Rotation

Rotating wheels are produced in much the same way as color flows and scrolling except that the colors are arranged in spoke or wedge patterns emanating from a central hub.

You can also produce a very effective rotation effect by drawing opposite spokes in the same color and then changing all but one of the spoke colors to the background color (000 or 777).

Explosions

To produce an explosion, start with a small nucleus at the center surrounded by larger and larger color bands made with successive colors along the palette from left to right. Each color band should have jagged protrusions into the adjacent color bands.

Use colors in the red-to-yellow portion of the color spectrum for your explosion, interspersing black as every third or fourth color for an even more realistic effect (see Figure 10).

Shooting

The blast from a gun, laser, or other weapon can be easily produced by alternating red (or another appropriate color) with the color behind the blast and cycling between colors. For example, in Figure 11, the red gunshot (left side) alternates with the blue of Mystery Man's cape.

If you want the shot to look as though it is moving, you can draw it in several segments. When you have finished, all the colors but one should be the same as the background color. By speeding up the color cycling, you can create a very realistic shooting effect.

Pouring and Flowing

Simulation of the movement of liquid is the most difficult effect to produce, but it is extremely impressive when done well. Start with a relatively small area and experiment with it. When you achieve a good effect, build a larger field of motion by copying a portion of the area and overlapping it with itself.

Unlike some of the effects described above, a flowing effect is best achieved by using the actual image colors right from the start. Good flowing images can be achieved with six to eight colors. Also, it is best not to use the colors in order from light to dark; rather, you should have two or three sub-orders.

For example, for water, try the following eight shades of blue arranged in this order: 577, 467, 357, 137, 016, 005, 337, and 357. Note that medium blue (357) is used twice. When you are first

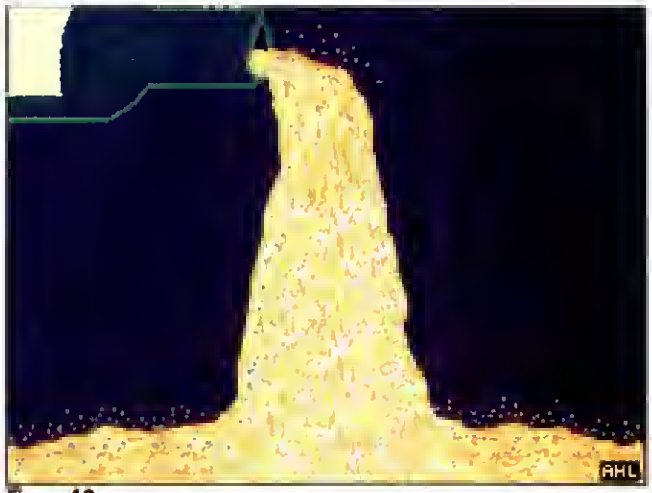


Figure 13a.

drawing your pouring effect, you may want to set the second 357 blue to green (070) to differentiate it from the other, but change it back to 357 to evaluate the final effect.

To draw flowing water, first use one color, say 577, to fill in the entire background of the area of the water flow. Then, using the next color (467), draw with the pencil a series of jagged but parallel lines about four or five pixels long in the general direction of the flow, creating a stripe perpendicular to the flow.

Cover about one-sixth of the area with these stripes, and repeat the process with the other seven colors. Don't be afraid to overlap the lines and make some lines shorter or longer than others. You should probably try to avoid making many lines longer than seven or eight pixels, as this tends to make the flow look too even.

If you want the flow to turn a corner, use shorter lines drawn in the direction of the curve; this will create a more realistic effect, as liquid tends to be more turbulent when the direction of its flow is changing. Similarly, where the flow hits an obstacle (a rock or the shore), turbulence will occur, so the flow should be represented with shorter lines.

Experiment with your flowing effect often. If you can't tell which direction it is flowing when you turn on color cycling, draw more groups of lines, arranged almost like color bands in the direction of the flow. If the flow appears too even, put some random clusters of different color pixels in the larger uniform color areas to introduce some turbulence. If it seems to change color too abruptly, try reversing the order of some of the colors between the delimiters, or try breaking up any large expanses of color in your image.

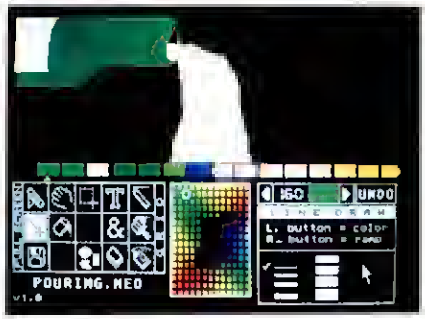


Figure 13b.

Figures 12, 13a, and 13b show two liquid effects. The first is the waterfall image that comes with the *NeoChrome* software package; the second is a simulation of pouring a bottomless bottle of champagne.

Note that in both cases the pouring effect is enhanced by the simulation of droplets bouncing in the air at turbulent points in the flow. These droplets are simply one- or two-pixel spots of the colors used in the liquid flow.

To save a color cycling image so that it cycles when you recall it with the Slideshow program, you must follow three steps. First, turn on color cycling in the desired direction by clicking the right mouse button over the scroll arrow to start the Slideshow timer. When the desired length of time has passed, turn off cycling by clicking on the opposite scroll arrow. Turn cycling on again, and immediately save the image to disk.

Using these techniques, you should be able to spice up your artwork and transform an interesting graphic into a truly riveting one. Happy animating! ■

Free Image Library!

We'd like to see your best ST graphic images and publish them in *Atari Explorer*. Each issue, we will select the best four or five images submitted and publish them in full color. The person submitting what we judge to be the best image each issue will receive a three-year subscription (or extension) to *Atari Explorer* and the three or four runners up will receive one-year subscriptions or extensions. Moreover, everyone submitting an image will receive ten original images in return.

Here are the rules: All images must be submitted on disk in either *NeoChrome* or *Degas* format. Your disk must be labeled with the format you have used and your name and address.

Also send a self-addressed envelope with 39 cents postage on it for the return of your disk. We will return your disk with ten additional images in the format of your choice.

You must include a signed statement as follows: "I certify that the image(s) submitted is my own personal work and that no portion was copied from any image belonging to another person or organization or from copyrighted printed or video material. I give *Atari Explorer* the right to print my image(s) and/or use it (them) in promotional material or computer show displays."

Please allow eight weeks for the return of your disk. If you are a subscriber, please include an address label (or copy) showing all the code numbers above your name so that we can extend the correct subscription if you win. ■

Bentley Bear Goes to School gives Atari's entry into the ST education market a big push in the right direction

Atari Classroom

By BETSY STAPLES

When school systems first started to buy computers to put in their classrooms, Atari 400's and 800's were among educators' top choices; they were sturdy, inexpensive (for the time), and capable of the outstanding graphics and sound effects needed to capture the attention of their students.

At the time, there wasn't much educational software available for any of the micros, but as more and more Ataris made their way into classrooms around the world, the body of software to support them grew to more than respectable proportions.

By the time the Atari 520ST hit the market, however, educators (and parents) had come to rely on an established library of proven educational software as a criterion for choosing a computer to be used in an educational setting. Unfortunately, such a library did not exist for the ST—one of the most capable and reasonably priced machines available today—until now.

With the acquisition of the Bentley Bear Goes to School series, Atari has made a serious commitment to quality software for the education market. And I don't say that lightly . . . or promotionally.

In fact, when Gershon Blumstein, Atari's director of computer software products, first told me that Atari was going to publish an entire educational curriculum for the ST and that he wanted me to review the programs, I had mixed feelings.

I was glad that Atari Corp. felt a responsibility to the education market. Then I remembered how few worthwhile educational packages I had seen over the years, and I began to worry.

I told Gershon that my first responsibility was to my readers and that if I reviewed the Bentley Bear products, my commitment to the editorial integrity of *Atari Explorer* would force me to tell the truth, the whole truth, etc. He said he wasn't worried.

And when the first two disks arrived, I knew why.

Bentley Bear's Magical Math

System: Atari ST
Price: $19.95
Summary: Very well-implemented arithmetic practice programs; entertaining and amusing.
Manufacturer:
Atari Corp.
P.O. Box 61657
Sunnyvale, CA 94088
(408) 745-2367

Magical Math I

Magical Math I offers practice in the basic math functions—addition, subtraction, multiplication, and division. The story is that Bentley Bear, to reach a pot of honey (Winnie the Pooh taught us that bears love honey, right?) on the other side of a deep pit, must build a bridge across the pit.

Bentley, an aristocrat among bears, refuses to muck around with sticks, stones, bricks, boards, I-beams, or any of the other more pedestrian elements of bridge construction. Bentley, like a woman I once knew who carried her wet wash out to the line on a silver tray, eschews the mundane; he paves his way with gemstones.

The source of the gems is an accommodating dragon, portrayed in glistening green detail, seated in front of his castle with his foot resting on a bottomless treasure chest. Bentley's nemesis is a wicked witch who attempts to reach the castle on her broom before Bentley can earn the gem.

To earn each gem, Bentley must provide the correct answer to an arithmetic problem. The problem appears in standard vertical format:

$$\begin{array}{r} 7 \\ +5 \\ \hline \end{array}$$

To choose an answer, you must move Bentley along the "Magic Number Bar" using the mouse. When Bentley is positioned over the rightmost number in the answer, you press the left mouse button and the number appears in its place under the problem. You follow the same procedure for each number in the answer, then position Bentley over the OK and click to enter the answer. Incorrect choices are easily erased with a click of the right mouse button.

All this must, of course, be done before the witch reaches the castle, because if she beats you, she swoops down and steals one of your gems. If it is your last, the game ends.

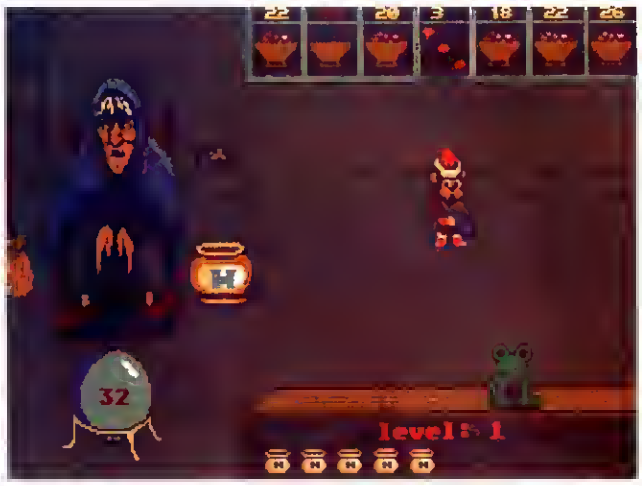
If you enter an incorrect answer, the dragon shakes his head no, and if the witch has not yet reached the castle, you can try again.

When the bridge is complete, Bentley runs across and disappears with the honey pot. You can then exit the game or play again at the next level.

The levels increase in difficulty very gradually, and after a while the gems become smaller, so you have to earn more of them to bridge the pit.

Before play starts, you use the mouse to choose the math function(s) on which you want to be quizzed—addition, subtraction, addition and subtraction, multiplication, division, multiplication and division, or all four functions together—the number of digits in the answer, and the amount of time allowed for each answer.

Magical Math I



Magical Math II

Magical Math I is an excellent program. It doesn't *teach* arithmetic, but it puts drill and practice in a logical, appealing, and entertaining setting.

Controlling Bentley with the mouse was easy for even our youngest playtesters, and entering the numbers from right to left (except in division), just as they had been taught in school, made it easy for the children to transfer paper-and-pencil skills to the computer screen.

The only thing that threw them for a time was the use of a slash to indicate division and the presentation of the division problems in the unfamiliar vertical format. Why not present these problems in one of the common horizontal formats? Perhaps in a subsequent release . . .

The other thing that could improve subsequent releases of both *Magical Math I* and *II* is a way to return to the "set-up screen" to change the speed, number of digits, etc., without rebooting. With the version we tested, if the child found the settings too easy—or too difficult—he could not make changes without returning to the desktop and clicking on the program icon to reboot—a cumbersome procedure.

The flexibility afforded by the large number of combinations of digits, functions, and time make the program suitable for a wide age range. Even some adults, whose grasp of the multiplication tables had atrophied through overuse of calculators, found *Magical Math I* a challenging review.

We received only preliminary documentation, which, though lacking in stated educational objectives and suggestions for related activities, was complete, starting with detailed instructions for making a backup copy of the unprotected disk; reasonably well-written; and comprehensible.

The graphics are superlative—from the dragon's scales to Bentley's belt buckle—and what would an Atari program be without a cute musical theme?

Magical Math II

Magical Math II places Bentley in the witch's cave, but now she is on his side and the adversary is a spider that drops down from the ceiling to steal the honey pot Bentley is trying to earn.

The witch conjures up a number in her crystal ball, and if Bentley can bring her a number of gems equal to the number in the crystal ball, he can add a pot of honey to his collection.

Seven blocks appear at the top of the screen, each with a number of gems indicated on it. Blocks for the lower numbers depict each gem and look a bit like dominoes, while blocks for higher numbers show simply a bowl of gems and a number.

With the acquisition of the Bentley Bear series, Atari has made a serious commitment to quality software for the education market.

Bentley must choose the two or three blocks the numbers of which when added together equal the number in the crystal ball. If, for example, the witch conjured up the number 20, Bentley would have to choose the blocks numbered 12 and 8.

Again, you control Bentley with the mouse, clicking when he is under the block you want to choose. When he has collected the proper number of gems, you take him to the witch, and if the answer is correct, she gives him the honey. As he scurries off-screen with his prize, a frog, which our playtesters came to think of as a cheerleader, croaks and hops up and down in the foreground.

If the answer is incorrect, the witch taps the side of her head, urging him to use his noodle, and if the spider has not yet claimed the honey, he can try again.

Each time Bentley collects ten pots of honey, you are offered a choice of moving to the next level or exiting the program. Before that happens, however, the cheerleading frog undergoes a startling metamorphosis . . . but we won't spoil the surprise.

Our playtesters found the task required in *Magical Math II* a bit difficult to grasp at first, but soon caught on and pronounced it "fun." Even our first grader was able to find the components of single-digit numbers and earn pots of honey for Bentley.

Again, by changing the speed of the spider and number of digits in the answer, the program can be made challenging to youngsters in a very wide age range.

All of the children had some difficulty controlling Bentley with the mouse in the witch's cave. Even after several hours of play, they were still mildly frustrated by it. How about a joystick option, Atari designers?

The above comments about the documentation of *Magical Math I* apply to *Magical Math II*, as does my praise of the graphics—the witch wears red nail polish and the frog . . . oops! I almost spoiled the surprise.

The first two packages in the Bentley Bear Goes to School series are excellent; if the other programs in the curriculum are as good, the Atari ST should soon come into its own as a fine educational tool. ■

The MichTron Utilities

This powerful package offers ST owners complete control over files and disks

MichTron's *Utilities 1.2* for the ST give you complete control over your files and disks. With this new-found power you can recover deleted files, repair damaged disks, format disks for higher capacity, and directly control file and disk contents.

Two things should be noted at outset. First, this is not a tool for beginners; a fairly high degree of technical knowledge is required to use the program effectively. Second, it is not a tool for pirates; the "file-oriented" features of the program can be used conveniently only with unprotected material.

Peeking at Your Disk

Using the MichTron *Utilities*, you can view the contents of a disk as raw sector data or in file form, in both hexadecimal and ASCII notation. When viewing raw sector data, information is displayed 256 bytes at a time, with drive, track, and sector number identified. Sectors can be selected for display by entering track and member sector as separate values (i.e., sector 10 of track 13) or by entering an absolute sector offset from the beginning of the disk.

When viewing a file, the same basic display format is used. However, the filename and your current relative position in the file are displayed in lieu of track and sector information.

The MichTron *Utilities* disk includes a *Degas* format snapshot program that allows you to save any screen with the Alt-Help keypress combination.

A nice search feature makes it possible to search through a file or disk for strings of up to 43 ASCII characters or 22 pairs of hexadecimal digits.

Repairing Disks

Sooner or later one of your disks will go berserk. A common scenario starts with the disk whirring feverishly, followed by a clunk, more whirring, more clunks, and ending with two or three bombs at the left side of an otherwise blank screen. Then you get a dialog box with a message like TOS error #35.

It is then that you remember the well-known computing axiom that states that the damaged disk is always the one you forgot to back up. If, however, you have MichTron *Utilities*, you may be able to save your disk (and your day).

Among the utilities are Verify Sector, Copy Sector, and Format Track, which used properly sometimes allow you to recover information from a damaged disk. These utilities permit you to examine each sector to determine which ones are good and which are no longer usable. That done, you can recover the good sectors on a backup disk.

After formatting the tracks containing the bad sectors, the Verify Sector option tells you whether those tracks are usable. If so, you can copy back the saved sectors. With a little patience, you may well find that your losses are minimal.

Oops!

Have you ever dragged the wrong file to the trashcan by accident? File Attributes can help you recover all or part of a file that has been deleted in this manner.

The key is that when a file is deleted, the information it contains isn't immediately erased from the disk. Instead, a "deleted" mark is placed by its name in the disk directory, and its sectors are identified for subsequent reclamation.

If you try to recover the file immediately after deleting it, there is a good chance that you can get it back in its entirety. If part of the file has been written over by subsequent disk operations, recovery becomes a bit more difficult—still, a significant portion of the file can often be recovered.

The procedure is fairly simple. Using the File Attributes utility, you check the disk directory. Deleted files appear in the directory with a Greek delta replacing the first letter of the file name. File Attributes guides your search for the clusters of sectors containing the file data until the file can be entirely reconstructed. If a file can't be reconstructed because of overwriting or some other reason, the program informs you that the reconstructed file might be corrupted.

Odds and Ends

There are some other nice features in the MichTron *Utilities* that are not mentioned in the printed manual. A provision to Clear Sectors and overwrite the areas with E5's prevents a file from being reconstructed by snoopy people.

The Read.me file on the disk also describes the Format utility which will format disks in either the standard nine-sector per track mode or an expanded ten-sector per track mode. The extended capacity format increases disk capacity to 389K and 789K for single- and double-sided disks, respectively.

Extended format disks can't be copied using the GEM Desktop. Instead, you must use the accompanying program MIDUPE.

MichTron *Utilities* comes with a well-written 44-page manual that describes each program feature. A four-page discussion of disks and formats is included.

MichTron also makes help available on a consulting basis to registered owners of the *Utilities* package. The charge is $25 per question or 15-minute consultation.

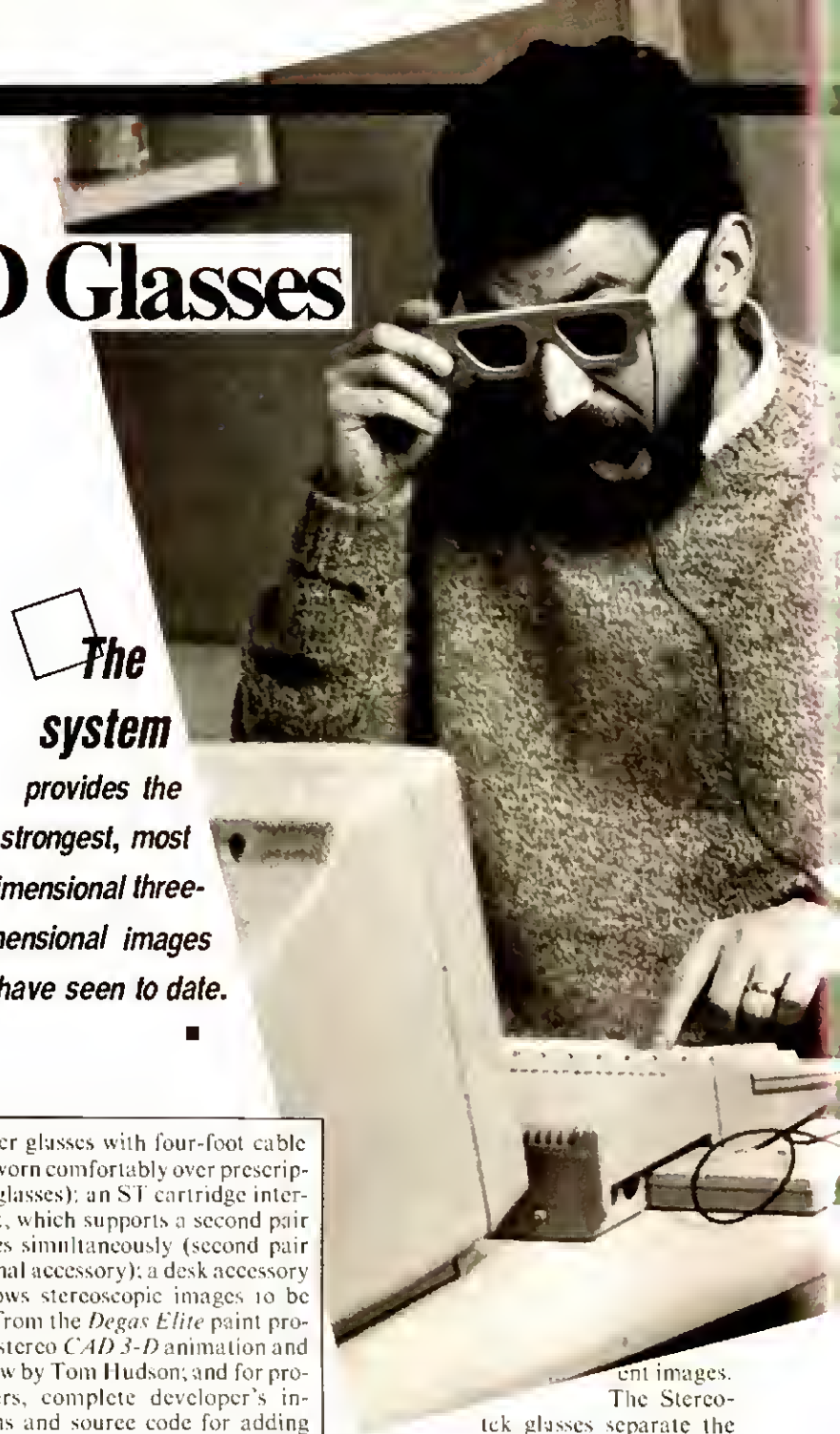
Having the MichTron *Utilities* disk on hand provides an unusual feeling of security as you wait for the inevitable crisis to occur. Just remember that the time to buy the package is *before* that crisis occurs. ■

MichTron Utilities v1.2

System: Atari ST
Price: $59.95
Summary: A useful package of utilities that may save your disks and your sanity.
Manufacturer:
MichTron, Inc.
576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700

By THOMAS M. CASTLE

Stereotek 3-D Glasses



When *CAD 3-D* first appeared for the Atari ST, Gary Yost of Antic Software told us about a system he would debut soon that would bring "true" 3-D to the images created with the *CAD 3-D* system. Well, it has taken Antic the better part of a year to deliver on that promise, but deliver they have, and now you too can bring stunning, stereoscopic imagery to the screen of your Atari ST.

Gary calls the Stereotek Glasses a "breakthrough," and it would be difficult to argue otherwise. The system provides the strongest, most dimensional three-dimensional images we have seen to date. Gone are the ghosting and primitiveness of analglyphic (red-blue) lenses. Gone are the color distortions of polarized lenses. In their place is truly dramatic depth of field that dares you to reach out and touch what seems to be there.

The system provides the strongest, most dimensional three-dimensional images we have seen to date. ■

New Technology

Stereotek glasses use a completely new technology to achieve three-dimensional imaging. Each lens contains a liquid crystal "shutter." This technology is akin to that found in liquid crystal watch displays and the like. But advances in liquid crystal technology allow the shutters to open and close up to 70 times a second. A wire runs from the glasses to an ST cartridge, which synchs the glasses to the vertical sweep of the monitor. In this manner, the glasses can synch perfectly to alternating images on the monitor screen. Right shutter closed: left eye image displays; left shutter closed: right eye image displays.

On a color system, the images cycle at 60 times a second. In hi-res monochrome, the images cycle at 70 times a second. The same optical effect—known as *persistence of vision*—that allows us to view regular motion pictures, integrates the two separate images into a single stereoscopic image with the appearance of depth. And it really, really works.

The Stereotek depth-view system includes one pair of electronic liquid crystal shutter glasses with four-foot cable (can be worn comfortably over prescription eyeglasses); an ST cartridge interface unit, which supports a second pair of glasses simultaneously (second pair an optional accessory); a desk accessory that allows stereoscopic images to be created from the *Degas Elite* paint program; a stereo *CAD 3-D* animation and slide show by Tom Hudson; and for programmers, complete developer's instructions and source code for adding three-dimensional images to your own programs. Price for the entire package is $149.95; an extra pair of glasses lists for $99.95.

How It Works

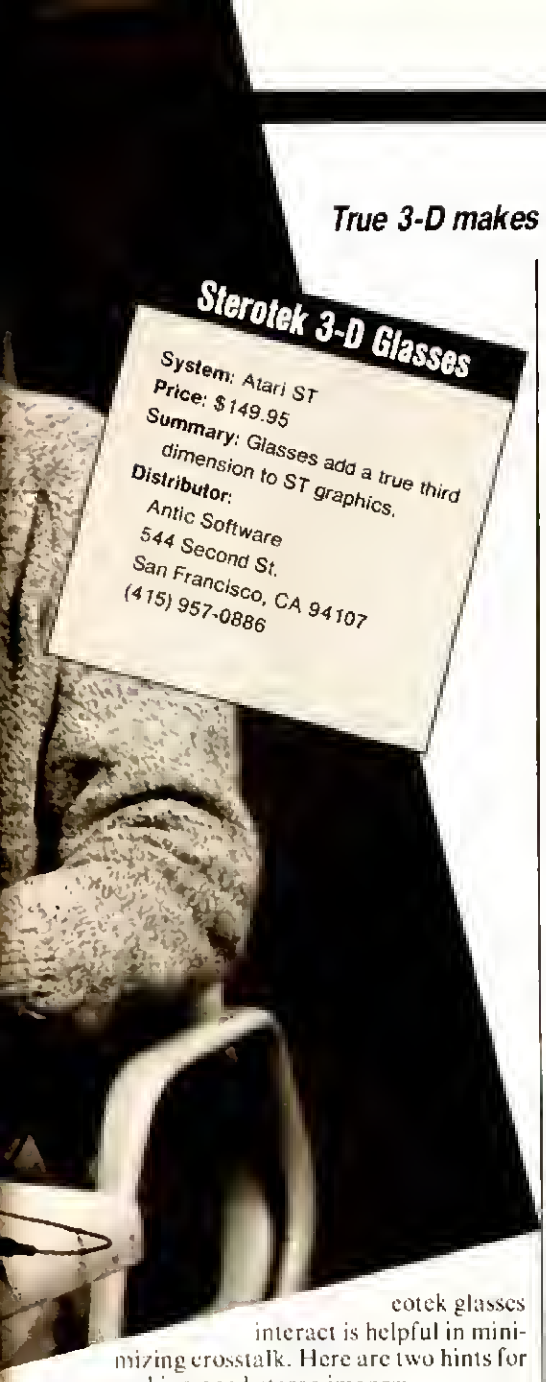
The Stereotek glasses use a technique called *binocular disparity* for creating a three-dimensional display. A display created by binocular disparity looks very realistic because it mimics the way the human brain "sees" three-dimensional objects. Your eyes act as two separate cameras which record two different images. The Stereotek glasses separate the images by sequentially shuttering the views created for each eye. How well each view is blocked from the "wrong" eye determines how well the binocular disparity technique works.

There are some system constraints with the Atari ST computer and Stereotek glasses which keep the left and right eye views from being completely separated. Due to factors related to phospor persistence and light blockage, a residual low-light image is transmitted to the wrong eye. This contributes to *crosstalk*—information that is meant for one eye but which is partially perceived by both.

Knowing how the monitor and Ster-

By JOHN J. ANDERSON

True 3-D makes ST graphics even more exciting



Sterotek 3-D Glasses

System: Atari ST
Price: $149.95
Summary: Glasses add a true third dimension to ST graphics.
Distributor:
Antic Software
544 Second St.
San Francisco, CA 94107
(415) 957-0886

eotek glasses interact is helpful in minimizing crosstalk. Here are two hints for making good stereo images:

- Residual image bleed-through can be made imperceptible by manipulating background illumination. On a monochrome monitor, keep the background white. On a color monitor, set the background to a neutral color at 50 percent intensity (images to be rendered at full intensity).
- Stereotek glasses block green light best, then red, then blue. Due to the nature of the liquid crystal shutters, green images sport the smallest amount of crosstalk.

Compatible Software

Antic has released a full complement of programs that are Stereotek compatible, and all are reasonably priced. They include:

- *Stereo CAD 3-D 2.0*—the new and very much improved three-dimensional modeling system by Tom Hudson. Stereo imaging is now built-in to the program. Other improvements include a redesigned icon control panel; a *Degas*-style color design system, which allows custom color lines, edges, and backgrounds, as well as multicolored objects; real-time display mode; true dimensioning; graphic lighting control; enhanced tools; and the capability to load *Degas* pictures into *CAD 3-D* backgrounds. The program comes bundled with *Cybermate*, a new animation language for *CAD 3-D* images. The package is priced at $89.95.
- *Architectural Design Disk*. While not intended for use as an actual architectural or engineering tool, the *Architectural Design Disk* allows you to create *CAD 3-D* renderings of your dream house or an entire city from the ground up. Component parts include doors, windows, arches, roofs, stairways, and a wide variety of architectural accoutrements. It sells for $24.95.
- *Human Design Disk*—your means to populate the *CAD 3-D* universe. Complete modular male and female prototypes, in skeletal and surface anatomy forms, are included. A variety of complex heads and hands add detail and realism to your figures. The disk carries a suggested retail price of $24.95.
- *3-D Font Package*. Design your own 3-D greeting cards, logos, signs, and letterheads with *CAD 3-D*. Or create sophisticated 3-D animated titles for your home videos. At the heart of this disk is Tom Hudson's new Super Extruder Tool; with it you can create new kinds of complex, multicolored 3-D objects that can't be built with *CAD 3-D* alone. The program doubles as a 3-D font editor and includes two complete fonts. It sells for $24.95.
- *Genesis*—a molecular modeling package. Using the package, you can create your own molecules onscreen or build them from pre-stored libraries. You can also rotate 3-D molecules on any axis—x, y, or z—using realtime control. You can create your own rules for molecular bonding, then animate the chemical reaction between them. The package, which requires at least one meg of RAM, is priced at $79.95.
- *3-D Developer's Disk*. While Tom Hudson was rewriting *CAD 3-D* for version 2.0, he realized that programmers needed a "pipeline" with which to access and customize the program for their own needs. Through desk accessories, he has provided this conduit. The *3-D Developer's Disk* clearly explains to programmers and developers how to access the pipeline. Included on the disk are full-featured source and object code examples, plus detailed instructions showing you how to hook into the code. There is no licensing fee. The program sells for $29.95.
- *LCS Wanderer*—the first ST game designed for full-depth stereo. Written in France, this space arcade adventure puts you in the cockpit as you swoop and dive through enemy starfields. The game is priced at $39.95.

If you are a graphics nut, wish to invest in the future of the ST, or just want to be able to show off a really neat technology which is likely to remain exclusive to the ST for quite some time, get yourself a pair of Stereotek glasses.

And oh yes, don't forget to download the SteelyBoink demo, available from the Antic node on CompuServe. It is a three-dimensional, full color, ray-traced, animated sequence, displaying five crystal balls bouncing inside the screen. As they move, they accurately pick up animated reflections from the walls all around them—an astounding demonstration of the powers of the ST when coupled with Stereotek glasses, and one you'll find yourself staring at for quite some time. ■

Antic has released a full *complement of Stereotek-compatible programs, and all are reasonably priced.*

This photo of the the P:R: Connection internals (left) shows the jumpers (upper left on the circuit board) that must be set to make the device work with some devices. On the right, the P:R: Connection appears fully clothed.

P:R: Connection

ICD offers a useful interface package for 8-bit users

When Atari engineers designed the 8-bit computer line, starting with the original 400 and 800, they chose to use a custom 13-pin Serial Input/Output (SIO) system to let the computer talk to peripheral devices. Over the years, Atari has released a long line of low-cost disk drives, modems, and printers, designed to interface directly to the Atari's SIO port, and most beginning computer users have found these "customized" peripherals easier to handle than "standard" devices that must be specially configured to work with Atari machines.

At the same time, Atari was not deaf to the pleas of more advanced users for some convenient way to interface standard peripherals. Their answer was the Atari 850 Interface Module, a device that plugged into the SIO port and provided four, individually-addressible, differently-configured RS-232 (R:) ports and one Centronics-compatible printer (P:) port. Using the 850 and appropriate cables, almost any peripheral could be connected to an Atari computer.

Once initial market demand was satisfied, Atari stopped manufacturing the 850 Interface. A recent upsurge in the number of Atari 8-bit systems sold, however, has re-established the need for a general purpose interface device that can be used to hook up standard peripherals.

ICD, Inc., saw the need and is currently filling it with the P:R: Connection. The unit is smaller than the old 850, measuring 5″ × 3½″ × 1⅛″, and uses low-power integrated circuitry to draw power from the computer, so it requires no external power supply of its own. (1200XL owners take note: a small modification must be performed before you can use the P:R: Connection with your machine. Instructions for do-it-yourselfers are included in the documentation.)

The P:R: Connection features two RS-232 (R:) ports (for modems and other serial devices) and one Centronics-compatible parallel (P:) port (for printers and other parallel hardware). To preserve compatibility with the 850 Interface, the ports on the P:R: Connection are non-standard: 9-pin DB connectors (as opposed to the usual 25-pin DBs) are used for the RS-232 ports, and a 15-pin connector (as opposed to the standard 36-strip edge-on Centronics connector) is used for the printer port.

Still, the special cables used for connecting the ports to standard RS-232 and Centronics parallel devices are easy enough to make (using the pinout tables on page 45 of the manual), or you can buy them directly from ICD at reasonable cost ($15 each).

Computer on a Chip

ICD claims that the custom chip that is the heart of the P:R: Connection is equipped with all the components of a stand-alone computer—ROM, RAM, CPU, and PIA (Peripheral Interface Adapter). The software needed to make the interface work loads automatically from ROM, so you don't usually have to deal with additional disk-based software.

ICD says that the P:R: Connection is compatible with all printer software and most terminal software, and for those products with which it is not compatible, ICD supplies a translator program called PRC.SYS.

Loading the PRC.SYS program at boot-up (by copying the file to a stand-alone disk along with DOS, renaming it AUTORUN.SYS, and using that disk as your boot disk) alleviates most incom-

By ANDY EDDY

P:R: Connection

System: All 8-bit Ataris
Price: $89.95
Summary: Uncomplicated hardware/software interface package.
Manufacturer:
ICD, Inc.
1220 Rock St.
Rockford, IL 61101
(815) 968-2228

patibility problems. ICD claims that they will "make every attempt to provide a patch or solution" to keep the P:R: unit working in harmony with future software releases.

Easy to Use

The P:R: Connection is very easy to use. You simply unplug the 13-pin SIO cable from a peripheral (say, a disk drive), insert it into the socket on the P:R: Connection, and connect the cable from the unit into the daisychain along with any other direct-connect peripherals you may have. (ICD recommends that you put their interface closest to the computer to avoid power problems.) Then plug your printer, modem, and other peripherals into the P:R: Connection using ICD's (or Atari's) 850-Interface compatible cables (or home-built equivalents).

Thereafter, the vast majority of software—Basic, most word processors, graphics packages, and terminal programs—will simply work. They will know that your printer, modem, and other peripherals are there and access them correctly (provided they have been configured properly to work with the software in question—always a problem with generic as opposed to tailor-made peripherals.) Unless you need to put PRC.SYS to work on an incompatible program, that's all there is to it.

The custom chip that *is the heart of the P:R: Connection is equipped with all the components of a stand-alone computer—ROM, RAM, CPU, and PIA.*

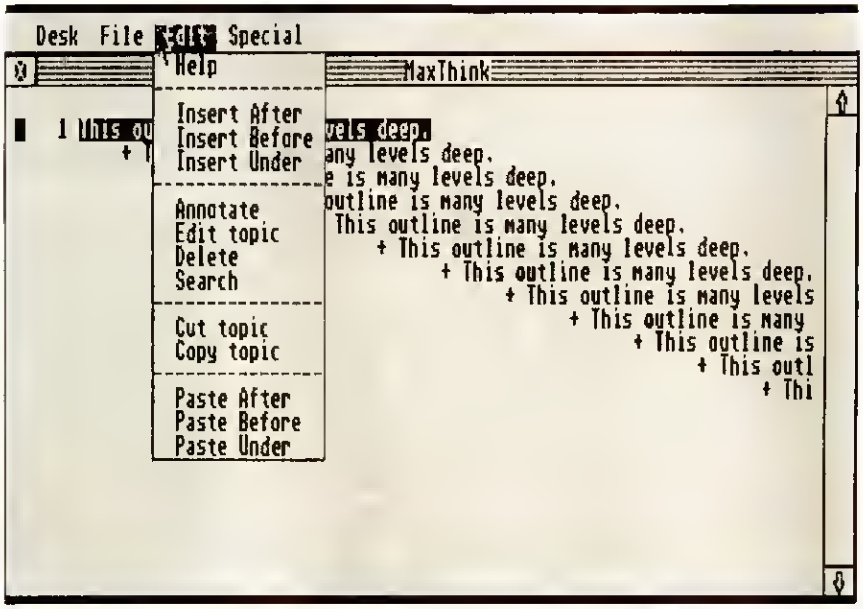
The manual is comprehensive, but because the unit is so easy to use, most of its pages are devoted to items of interest to the technically-inclined—source code for the R: Handler, pinouts for the three ports, and hints for programming with the P:R: Connection.

The only complaint I have about the device concerns the two jumpers on the circuit board that the user can set to make the P:R: Connection work with certain other devices and to force a linefeed after a carriage return—something you will find helpful if you plan to have your 8-bit share a printer with your ST. These switches are accessible only by removing the four screws that hold the interface together; an easier way to get at them would improve the ease-of-use factor significantly.

At a cost of $89.95, this product is an excellent buy. Included in the package is a disk containing three public domain terminal programs, one of which, Express, is so powerful and feature-laden that it could easily be marketed commercially.

ICD also offers a number of other hardware products designed to harness the full power of the Atari 8-bit line. Keep your eye on ICD; I think the company has a bright future. ■

Using the Edit menu, you can quickly and easily organize your thinking into topics and nested subtopics.



MaxThink

This writer's tool for the ST helps you get your thoughts in order

By JOHN J. ANDERSON

Many of us who write for a living have discovered the remarkable power of the word processor. Revision, which is the true process of writing, is immeasurably easier on the computer screen, as opposed to the legal pad or typewriter. When making changes, additions, deletions, and corrections, writing with a word processor saves time, effort, and pain.

But when you think about the services a word processor performs, you realize that they fall into a category that could be labeled "secretarial." The word processor is at its best dealing with the mechanics of entry, editing, and the appearance of the final copy. But what about the things that are supposed to happen before the keys are ever pressed—the organization of your ideas, the structure of the document, its content, and the relationships between the different parts? Shouldn't a computer be able to help a writer not only polish the final product but polish the underlying thoughts as well?

Where Your Word Processor Leaves Off

Enter *MaxThink* for the Atari ST. *MaxThink* is labeled an "idea processor," and it picks up where your word processor leaves off—or perhaps more accurately, at a point long before your word processor can be truly effective. If you are familiar with an older product called *ThinkTank* from Living Videotext, *MaxThink* will remind you of it; both products are at their hearts outlining tools.

Unfortunately, early schooling has instilled in most of us a shudder reflex at the mere mention of the word "outline." It takes us back to junior high where our teachers forced us to construct mammoth outlines nesting the thousand components of the War of 1812 in indented cubbyholes neatly labeled with numbers, letters, and the height of high school chic, Roman numerals. School makes the outline into a daunting prospect—an exacting, precise art, calling for massive revision itself in order to be effective. My own memories of sitting in front of a typewriter, white-out in one hand and my social studies book in the other, are etched in my mind.

The fact is that an outline is simply an organized list, and making lists, whether aimed at the local Chinese laundry or superpower arms control, is one of the most effective ways of giving definition to our thinking. The true power of *MaxThink* is that it provides a structure that makes creating and revising outlines easy—I would not hesitate to say "intuitive," if that word were not so overused.

Even before you know exactly what you want to say, *MaxThink* can help you explore and solidify your thoughts.

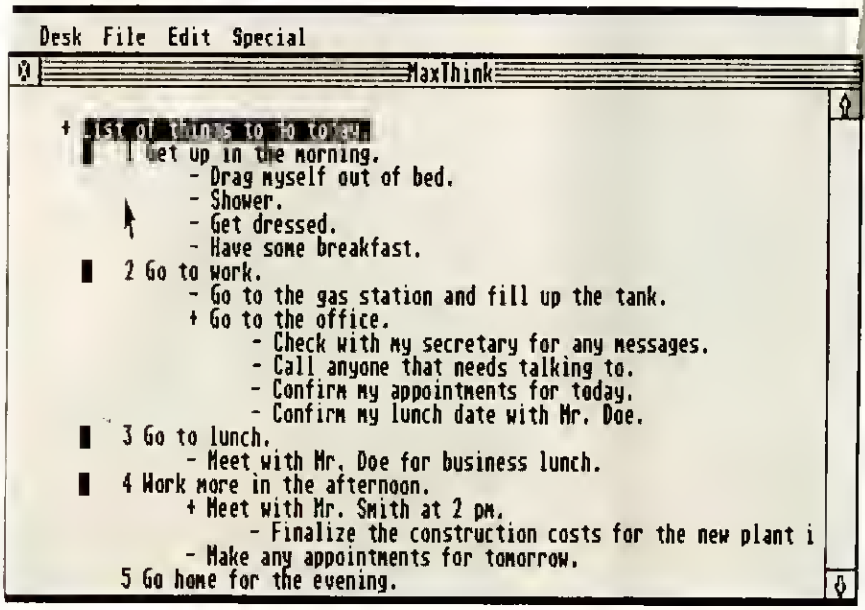
Using MaxThink

MaxThink is like a word processor in that it manipulates text using the conventional interface of keyboard, screen, and mouse movements. As such, it mimics the familiar processes of *STWriter* and requires many of the same skills. Starting with those processes and skills, *MaxThink* moves to list processing, as it includes commands to collect, organize, alphabetize, sort, segment, prioritize, and display lists of text. The *MaxThink* list formats and commands help you examine your information for completeness, parallelism, and sequence. It moves from simple lists to outlines, using commands that organize, develop, and display information in hierarchical formats.

MaxThink painlessly offers four major benefits that would be impossible to achieve with a mere word processor. *MaxThink* displays the relationships between concepts; it allows information to be expanded or contracted strategically to focus on important components; it allows information to be assembled or broken down in different ways, with a minimum of effort; and it simplifies classification, categorization, and grouping operations.

The default *MaxThink* screen looks much like the default screen of a word processor, and in fact, you can enter text just as you would using a word processor. But when the time comes, using the Edit menu, you can quickly and easily organize your thinking into topics and nested subtopics. Each topic can include as much or as little text as you desire—from a blank line to be filled in

When printed out or viewed, MaxThink automatically adds the numbering your teachers were so fussy about.



Idea Processor

Shouldn't *a computer be able to help a writer not only polish the final product but polish the underlying thoughts as well?*

System: Atari ST
Price: $59.95
Summary: A powerful organization tool designed to help you improve your writing.
Manufacturer:
MaxThink
230 Crocker Ave.
Piedmont, CA 94610
(800) 227-1590
(800) 642-2406 in CA
(415) 428-0104

later to pages and pages of prose.

Once an outline is created, it can be saved, printed, or viewed. When saved, it can be stored as an outline or as an ASCII document, which can then be read by a word processing program. When printed out or viewed, *MaxThink* automatically adds the numbering your teachers were so fussy about: cardinal, ordinal, alphabetic, and Roman numeral characters are available at the touch of a key.

Commands

The operations you can perform on outlines are varied and powerful. A fast-move option allows you to cut and paste with a minimum of effort. In this mode, the cursor turns into a scalpel until you indicate the cut. Then it turns into a syringe until you "inject" the information where you want it to be. Blocks of text can also be cut or copied, and a host of specialized paste commands puts topics just where you want them.

Just to the right of the pull-down Edit menu is a sort menu, which offers a range of sort operations. Prioritize allows you to organize a list of topics by importance.

Just above the listed topics is a dividing line with the sentence "Click Here to Rotate List." In this way, you can click through a list, ordering its components without muss or fuss.

The Binsort command converts a list of topics into subtopics of several user-defined categories. The metaphor is "tossing each topic into the appropriate bin" to quickly convert a long list of disorganized topics into several smaller groups or categories. Other available sorts are Levelize, which allows you to move a specified number of levels of subtopics up to the same level as their parent topic; Randomize, which lets you mix up the order of a range of topics, producing new, possibly helpful patterns of thought; and Alphabetize.

In addition, *MaxThink* offers eight "markers," which create a look-up table for quickly moving to designated topics in your outline.

Documentation

The documentation for *MaxThink* is quite well-done—a good thing for a product that advertises improved writing skills. In fact, a writer's guide that constitutes the second half of the documentation not only summarizes how to get the most out of *MaxThink* but offers very sound general advice. It offers its services to "writers, thinkers, planners, scholars, managers, designers, executives, consultants, and other intellectual entrepreneurs."

MaxThink is capable of building a 100-level outline, encompassing more than 4000 topics. It supports multiple windows, allowing two outlines to be open simultaneously, and cut and paste from one window to another.

While I would not use *MaxThink* for every writing project, it is a well-built tool, and I appreciate having it around. When my next big project comes around, I'm sure I will boot *MaxThink*. It is more powerful and more practical than *ThinkTank* and much easier to plan with than a pencil, typewriter, or word processor. ■

One of the things that makes this outstanding game unique is the story of designer Brodie Lockard

Shanghai: A Unique Computer Game

Sometimes, tragic accidents alter lives forever and change the destinies, sometimes for the better, of the people involved. It makes a good story.

Brodie Lockard's story isn't like that. Even before the fates battered him on a flip off a trampoline, he knew where he would look for success. And now, six years later, he has found it.

"I started out as an English major and later changed to math sciences," Brodie recalls. "At the time, Stanford didn't offer a bachelor's degree in computer sciences."

But Stanford did offer gymnastics. "A friend of my brother's was on the high school team," he remembers, "so I got into it in high school when I was 13."

Then, in early 1981, "we were using a trampoline and a foam pit to practice dismounts for other events. The feeling was that you could land any way and be safe. Unfortunately, in my case, that didn't happen. I jumped a little too far and landed on my back and shoulders. I was in the hospital for nine months."

While in the hospital he learned that he was a quadraplegic, paralyzed below the shoulders. Obviously, gymnastics would no longer be a part of his life. But he was determined that computers would still figure in his future.

Back to School

"I really wanted to go back to school; that was my top priority," says Brodie. "I was out of the hospital the first week of September, and I went to school the next month."

But for disabled students, sometimes just getting to class is a difficult chore. "Stanford was quite helpful," he says. "It might have been the first time that a Stanford student had been seriously hurt and returned to school. I think my return helped make them more aware of the difficulties involved. They now have note-taking services for students, and there are ramps into most of the buildings. When I had a class in a building that was inaccessible, they moved the class for me."

But that covered only the problem of getting to class. It didn't begin to address the problem of working with a computer without the use of his hands, a problem he has solved by learning to press the keys with a stick held between his teeth. "The main problem I ran into was trying to hit two keys at once," he recalls.

Control Data Corporation did a lot to smooth the road back to mainstream education for Brodie. "I had worked on their Plato educational network before I got hurt," he says. "When I got back to school, they furnished a terminal that I could use free of charge. I honestly couldn't have finished school without that."

Into the Limelight

Brodie has recently found himself in the limelight as his game creation, *Shanghai* from Activision, has acquired an avid following. The game uses the tiles from Mah Jongg, but otherwise plays more like a solitaire card variant than its oriental ancestor, which plays more like Gin Rummy.

"Somebody showed me a game about seven years ago, right after my acci-

By RICK TEVERBAUGH

dent," he remembers. "It didn't have a name at that time, but it became *Shanghai*. I thought it would be a neat game to put on a computer because of all the things a computer could do, like back up moves and give advice."

Still, a strategy game is a long way from the educational work he was doing with Plato at Stanford. Why a game? Brodie explains, "I did it for fun and to learn the C programming language. In the back of my mind, I thought it would be niee to make it into a product, but I didn't know if I had the knowledge to do a version for micros."

His contact with Activision was fortuitous. One of a number of résumés he sent out in hopes of finding a job fell into the hands of Brad Fregger, whose work includes such Activision products as *Portal* and *Gamemaker*.

"He gave me a call," says Brodie. "We met and talked about computer gaming in general. He told me to call him when I had something presentable to show him.

"When I got *Shanghai* working, I called him. He came over and looked at it and told me he was fairly interested. The more he played it, the more interested he became. We worked on a mutual trust basis for quite a while. There wasn't anything legal for a long time. Then we finally did sign a contract, and your readers can see the result on their dealers' shelves."

The game has been selling quite well for Activision. Though the company does not release sales figures, Brodie says that the game had sold 40,000 copies the last time he saw figures.

"The game is now available for eight or nine machines," he says with obvious and understandable pride. "I guess it's a pretty big hit, but I have nothing to compare it to."

But he can compare the versions for different systems, and he likes the Atari ST product very much. "One thing I really like is the three-dimensional effect of the cards in the ST version. It makes the cards easier to identify and the game easier to play."

What's Ahead

Shanghai fans are beginning to ask about a second Brodie Lockard offering. "I'd very much like to do another game," he answers. "But I don't have any ideas on the drawing board right now."

One serious program he has been working on at Stanford could provide the basis for a game. "One of the first programs our group did was a simulation of French society called the Would-Be Gentleman, in which a 30-year-old peasant works his way up the socio-economic ladder. We're working on a general version of that. Professors could create a Would-Be Sammurai or a Would-Be Knight. It would be kind of a social simulation tool kit."

Overall, Brodie is realistic about his physical limitations and his future as a programmer:

"As far as coming up with new ideas and writing programs, I can hold my own OK," he says, "but I have trouble using the keyboard and mouse on new machines. I've always been the kind of person who wanted to do anything I attempted very well. Now that I have limitations that other people don't have, I just have to work that much harder to do a better job." ■

Shanghai

Computer gaming can be a drag . . . what with rehashed shoot-'em-ups, minor variations on adventure themes, and myriad versions of bored . . . I mean board . . . games. But *Shanghai* has changed all that.

Shanghai gets its inspiration from Mah Jongg, an ancient Chinese game. You have a "dragon" of tiles stacked in five layers. As in the card game Concentration, you must remove tiles from the stack by matching pairs, which is not as easy as it sounds, because only "free" tiles can be taken from the pile—a tile is "free" if no other tile is on top of it *and* it is not blocked by another tile from sliding off the stack sideways.

As in most solitaire games, you may have a variety of moves from which to choose, and making them in the wrong order may prevent you from completing a board.

The concept is simple, which is part of what makes the game so enthralling. By your second or third game, you have the rules down pat, and by your fourth or fifth game, you are hopelessly addicted.

The computer handles housekeeping chores—signalling illegal moves, reshuffling tiles for a new game, etc.—and because it can save any board, you have the luxury of trying a variety of different strategies to see which works best. You can even, if things get really tough, request a hint.

There are four ways to play the game, some of which allow additional players to enjoy the fun. Excellent mouse control gives the game a very smooth "feel," and the outstanding ST graphics impart a level of realism and beauty seldom found in strategy games.

Shanghai is a rare treasure in a cave of clones; I give it my highest recommendation.—***Andy Eddy***

PLAYABILITY

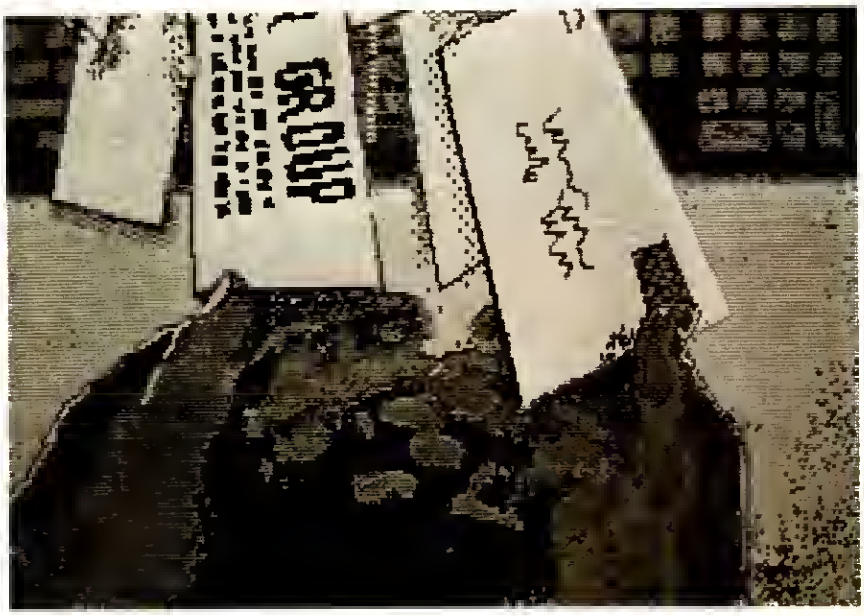
CHALLENGE

ADDICTIVENESS

GRAPHICS

EASE OF LEARNING

System: Atari ST
Price: $44.95
Summary: Compelling oriental board game
Manufacturer: Activision
P.O. Box 7286
Mountain View, CA 94039
(415) 960-0410



User Friendly

Helpful hints from the user groups

User groups are renowned for helping people get the most out of their Atari computers. However, those who profit indirectly from the presence of user groups—the thousands of attendees at recent Atari Expos, for example—seldom realize the enormous amount of work that goes into maintaining the group as a resource for the community.

A typical user group is a fairly formal organization with bylaws, elected officers, facilities that may include both disk and hardware resource libraries, and usually, a regular newsletter.

Atari Explorer receives scores of newsletters each month from groups all over the country and around the world. Many of these mini-magazines are of quality nothing short of extraordinary—professionally written, well laid-out and illustrated (more and more often via Atari desktop publishing software), they are a real pleasure to read. Moreover, they contain a wealth of useful information—from reviews to think pieces to technical tidbits and helpful hints.

This month, User Friendly celebrates Atari user group newsletters and congratulates the hundreds of people who put these quality resources together. To give you an idea of the useful material these newsletters contain, we went through a stack of recent issues and pulled out some of the more interesting technical tips, short programs, and hints that fill their pages. We share them with our readers here with the gracious permission of their authors and original publishers.

SBACE

The Santa Barbara Atari User's Group (P.O. Box 3678, Santa Barbara, CA 93130) is a well-established group whose newsletter is now in its sixth year of publication.

In the November, '86 issue of the SBACE Newsletter, Fred Olivas offers an 8-bit Basic hint: Have you ever wanted to get rid of the question mark prompt that follows an INPUT statement? Substitute INPUT#16; for INPUT, and the question mark will not appear.

From the December '86 issue of

By JOHN JAINSCHIGG

SBACE Newsletter we took the program in Listing 1. Written by WAACE's Mark A. Brown, it flashes a subliminal message of your choice on your 8-bit screen every few seconds. It may help you lose weight or stop smoking or turn you into a pod person—use at your own risk!

JACG

The Jersey Atari Computer Group is another long-time presence on the East Coast Atari scene. In their well-written and beautifully put together newsletter, JACG's Tom Reichard offers a simple screen dump utility (Listing 2) that lets you type on your Graphics 0 screen, then dumps the text to your printer when you press the Start key. To resume, press Shift-Clear.

RIACE

Taken from the Rhode Island Atari Computer Enthusiasts Newsletter, Listing 3 gives you Phil Hawkins's demonstration of using ST Basic to control the width of lines drawn on the ST screen.

From the above sampling, we're sure you'll agree that there is a lot for every Atari user in the local user group newsletter. And you can benefit even more from joining the group itself—membership cost is always reasonable (sometimes free), and pays for itself many times over in help, cooperation, and good company.

If you don't know how to contact the Atari user group in your area watch these pages for a directory of user groups worldwide. ■

```
10 OPEN #1,12,0,"E:":PRINT #1;"  Subliminal suggestion
 - Input now   ":POKE 82,10:POKE 83,29:PRINT #1:DIM A$
(75)
20 INPUT #1;A$:FOR A=1 TO LEN(A$):GOSUB 70:POKE 1663+A
,B:NEXT A:FOR A=LEN(A$)+1 TO 41:POKE 1663+A,0:NEXT A
25 FOR A=1 TO 75:READ B:POKE 1535+A,B:NEXT A:POKE 82,2
:POKE 83,39:CLOSE #1:GRAPHICS 0:A=USR(1536)
30 PRINT CHR$(125);"Message now activated":PRINT "Wait
 a few seconds..." END
40 DATA 104,169,6,170,160,9,76,92,228,206,72,6,240
50 DATA 5,48,27,76,95,228,173,48,2,141,73,6,173,49,2,1
41,74,6,169,62,141,48,2,169,6,141,49,2,208,229,173,73
60 DATA 6,141,48,2,173,74,6,141,49,2,169,120,141,72,6,
208,210,112,112,112,71,128,6,7,65,62,6,1,0,0
70 B=ASC(A$(A,A)):B=B+32*(B>=32 AND B<=95)+64*(B>=0 AN
D B<=32):RETURN
```

Listing 1.

```
10 REM SIMPLE SCREEN DUMP  T. REICHARD
20 DIM SCR$(40*25),H$(40)
30 CLOSE #2:OPEN #2,4,8,"K:"
40 CLOSE #4:OPEN #4,13,0,"E:"
50 POKE 82,0:POSITION 0,0:PRINT CHR$(29);CHR$(28);
60 POKE 764,255
70 IF PEEK(53279)=6 THEN 130
80 IF PEEK(764)=255 THEN 70
90 GET #2,KEY
100 PRINT CHR$(KEY);
110 IF PEEK(84)=23 THEN 190
120 GOTO 60
130 POKE 752,1:POSITION 0,0:PRINT CHR$(29);CHR$(28);
140 FOR ROW=0 TO 22
150 H$=""
160 POSITION 0,ROW:INPUT #4;H$
170 LPRINT H$
180 NEXT ROW
190 POKE 752,0:POSITION 0,0:PRINT CHR$(29);CHR$(28);
200 GOTO 60
```

Listing 2.

Listing 3.

```
100  FULLW 2:CLEARW 2
110  I=10
120  LINEF 10,C+I,290,C+I
130  I=I+20
140  FOR C=3 TO 25 STEP 2
150  GOSUB SET.WIDTH
160  LINEF 10,I,290,I
170  I=I+21
180  NEXT C
190  C=2:GOSUB SET.WIDTH
200  A=INP(2)
210  END
220  SET.WIDTH:
230  POKE CONTRL,16
240  POKE CONTRL+2,1
250  POKE CONTRL+6,0
260  POKE PTSIN,C
270  POKE PTSIN+2,0
280  VOISYS
290  RETURN
```

Atari Fair Schedule

Detroit, MI
MAGIC
August 29-30, 1987
Southfield Hilton

Glendale, CA
ACENET
September 19-20, 1987
Glendale Civic Auditorium

Worcester, MA
Boston Computer Society Atari SIG
October 10-11, 1987
Worcester Centrum

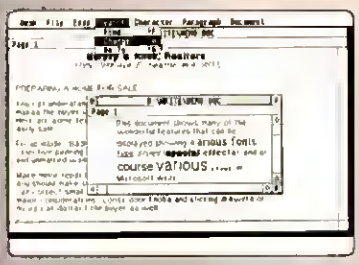
Fairfax, VA
WAACE
October 24-25, 1987
Fairfax High School
Rtes. 50, 29, 211

For more information, contact Sandi Austin, Atari Corp., 1196 Borregas Ave, Sunnyvale, CA 94086 (408) 745-2012.

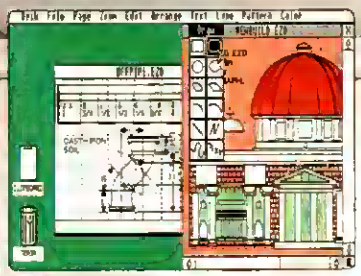
Address Change

If *Atari Explorer* is currently on your user group's mailing list, please check the address. Many groups are still sending their newsletters to us by way of Sunnyvale—a route that adds two to three weeks to the delivery time.

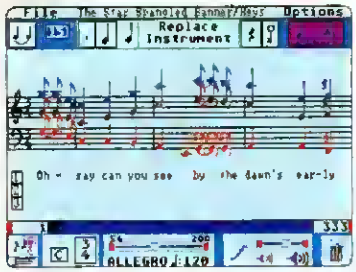
Please send newsletters to *Atari Explorer* at 7 Hilltop Rd., Mendham, NJ 07945.



Word Processing



Graphics & Design



Music Composition

The ST features familiar icons, spectacular graphics, mouse control windows, drop-down menus and on-screen directions for ease of use.

The ST transfers data at 1.33 megabytes per second. Which means it could transfer the entire works of Shakespeare in less time than it takes to read this ad.

The ST keyboard is identical to that of standard data terminals, so it's already familiar.

Introducing technology

Finally, there's a personal computer that not only solves problems like other computers, but also solves the one problem other computers created. Affordability.

Introducing the ST™ Computers from Atari: The 520ST™ with a 512K memory and the 1040ST™ with a full megabyte. The ST was designed utilizing the most recent breakthroughs in semiconductor technology, producing a PC that does more tasks with fewer parts.

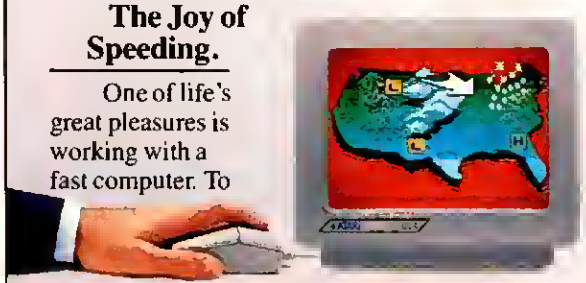
Which means it costs less to make. And less to buy.

The Joy of Speeding.

One of life's great pleasures is working with a fast computer. To bring the ST up to speed, Atari starts with the Motorola 68000 chip—the same "brain" you'll find in the Macintosh.™ Then, Atari adds the extra oomph of four exclusive chips—specially designed to handle several functions simultaneously. (Other PCs limp along handling one function at a time).

This results in making the ST much faster in the computing process. Faster in moving data within the system. Faster in getting information to the screen.

So now, you can run programs like word processing, database management, and financial planning with more zip and efficiency than ever before. A nice feeling.



Compare Our Components.

A computer is only the sum of its components. So we made each one better. Look at the layout of the ST keyboard, for example. You get a full numeric keypad. Plus a cursor control keypad with editing keys. Plus 10 programmable function keys. Now add the mouse and consider the options.

The monochrome monitor is a beauty. Taking its broad bandwidth signal from the ST's exclusive video chip, it displays a resolution of 640 × 400 pixels. This gives you razor-sharp, jitter-free text display for word processing and CAD work (very easy on the eyes). Or, for stunning color images, add the RGB color

T H E **S T** C O M P U T E R S

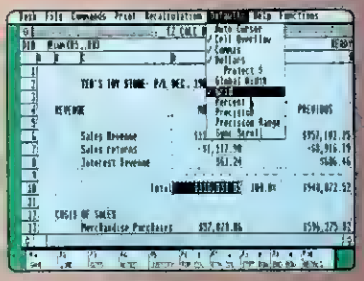
The ST includes a three-voice sound chip with a range from 30 to beyond 20,000 Hertz. The Amiga™ and Macintosh are limited to a maximum of 7,000 Hertz.

The ST works with a wide range of IBM® compatible printers. Including laser printers and plotters.

The easy-to-read manual will have you working on your ST in minutes.

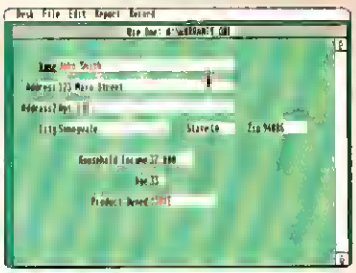
You can use command keys, or a mouse. It's your choice.

The 3-1/2 inch encased disk is more durable and easier to work with than the standard 5-1/4 inch floppy.



Spreadsheets

Entertainment



Database Management

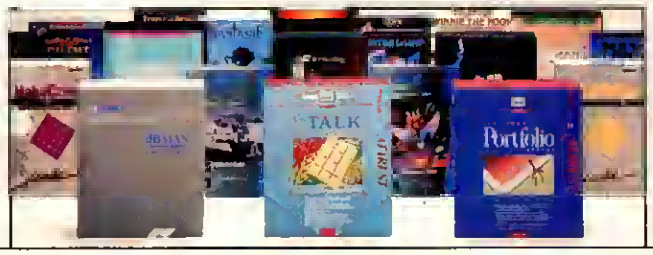
so advanced, it's affordable.

monitor. No interface board needed. Just plug it in. (Try doing that with a Mac!)

You get an external disk drive with the 520ST. An internal, double-sided disk drive with the 1040ST. Both have a disk speed many times faster than previous PCs. And they're blissfully quiet.

Plus, many of the costly peripherals you have to add on with other PCs are already built into an ST. Like the built-in MIDI (musical synthesizer interface) port. And the industry-standard printer port and modem port. And for even more memory, a port for the SH204™ hard disk drive, with twenty megabytes of storage and the fastest transfer rate in the industry.

With hundreds of software programs already available, an ST can grow with your imagination, or your business. Companies like Microsoft,® Spinnaker,® Activision® and more are continually making contributions to the ST software library. And some popular programs originally designed for other computers are actually being upgraded to take full advantage of the ST's capabilities!



The Price of Power.

Best of all, the cost of an ST is so low, it may come as something of a shock. The 520ST sells for under $800, including monochrome monitor.* The 1040ST, with a full megabyte of memory, for under $1,000. That's less than one dollar a Kbyte.

So now, you don't have to be rich to be powerful.

To see why Infoworld called the ST "The best hardware value of the year" check it out at your Atari dealer. For the one nearest you, call 1 800 443 8020. 9AM-5PM Mon.-Fri., Pacific Time.

*RGB color monitor, $200 additional.

THE ST™ COMPUTERS from ATARI®

Bottom Line

By DAVID H. AHL

EZ Calc is a full-featured spreadsheet capable of manipulating a 300-column by 999-row matrix. It was designed by Don Marr of Royal Software specifically for the Atari ST; consequently, it takes full advantage of the mouse and the GEM windows and operating environment. It makes efficient use of the ST memory and, at $69.95, continues the Atari tradition of "power without the price."

As you know if your read our reviews of *Power Plan ST* and *VIP Professional*, we like to evaluate a spreadsheet in terms of four areas common to all spreadsheets and then look at its extra or extended features, ease of use, performance (speed), and documentation. The four common areas are: layout and labeling, formulas and functions, windows, and graphics.

Layout and Labels

Because a spreadsheet generally has long labels (titles) in the leftmost column, it is desirable to be able to set column widths independently; *EZ Calc* allows you to do this. Secondly, if a label is wider than the cell width, it should be able to spill over into the next cell if that cell is empty; *EZ Calc* does this correctly also.

EZ Calc automatically defines a cell as a label if the first character typed is non-numeric. To use a year or check number as a label, you must type an apostrophe preceding the number. Like *1-2-3*, but unlike some other Atari ST spreadsheets, *EZ Calc* does not show the apostrophe on the screen; neither does it print it.

EZ Calc

System: Atari ST
Price: $69.95
Summary: Full-featured, memory-efficient spreadsheet with graphics.
Manufacturer:
Royal Software
710 McKinley
Eugene, OR 97402
(503) 683-5361

Frequently, when using a spreadsheet, you want your columns to be formatted or justified differently. The Justify command in *EZ Calc* allows you to right, center, or left justify all the entries in a column.

It is not nearly so obvious how to format individual columns. Step one is to place the cursor at the top of the column (or portion of a column) you wish to format. Next, you select Precision Range in the Defaults pull-down menu. Then, you specify the end of the range you wish to format, and finally, you set the number of decimal places. Oddly enough, you move from item to item in this pull-down menu by using the *spacebar*.

We were rather disconcerted by this sort of inconsistency throughout *EZ Calc*. In some menus, you must move from item to item using the mouse. Others require the spacebar, and still others use the Return key. Frankly, this is difficult to keep straight, and you may well find youself—as we did—exiting a menu inadvertently because you used the Return key instead of the spacebar.

In the Default menu, you can also format your spreadsheet by placing dollar signs before all values and by inserting commas into all numbers with more than three digits. Precision can be set for up to 12 decimal places; there is no provision for expressing numbers in scientific format.

Formulas and Functions

EZ Calc uses the familiar Lotus *1-2-3* convention for expressing cell coordinates—A1, F128, etc. These cell coordinates are then used in formulas and functions as well as with numeric and logical operators.

The logical operators are quite powerful, for example:

@IF(A1<A2,10,20)

is read: If the value in cell A1 is less than the value in cell A2, return the number 10; if not, return the number 20. The IF command can be combined with arithmetic operators (greater than, equal, etc.) and three logical operators (not, and, and or).

References to a cell in a formula are normally relative. That is, if a cell containing a formula is moved or copied, cell references in the formula will be changed such that they remain the same relative distance from the cell containing the formula. However, if you wish cell references to be absolute (always refer to the same cell), you may precede the cell reference with a dollar sign. Absolute references can also be designated when moving, copying, or replicating a cell.

EZ Calc boasts an excellent list of functions: seven mathematical, seven trigonometric, five statistical, five financial, three data management, and three error trapping. About the only

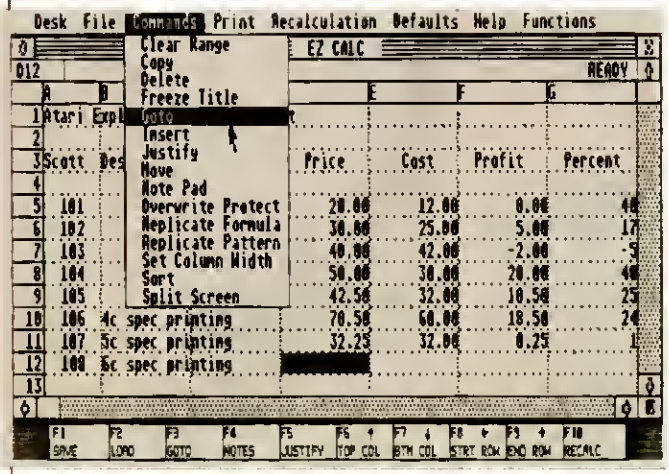


Figure 1. Command menu and part of a spreadsheet.

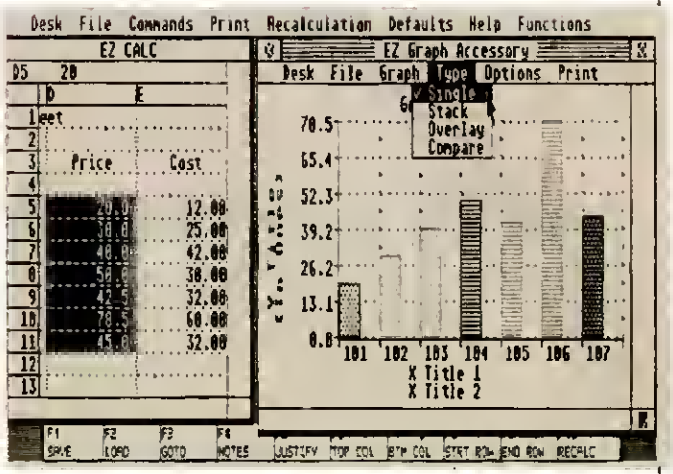


Figure 2. Graphs are displayed in a window to the right of the spreadsheet.

functions available in *1-2-3* that are not found in *EZ Calc* are ROUND (round off numbers), STD (standard deviation), VAR (variance), and the group of day and date functions.

Interestingly, the present value functions in *EZ Calc* return values that are 100 times those of other spreadsheets. Because one of the arguments of present value calculations is interest rate, the difference probably has to do with the way interest is expressed (is 12% expressed 12 or 0.12?).

As we have come to expect in a full-featured spreadsheet, *EZ Calc* can replicate rows, columns, or blocks of cells, and sort rows and columns. *EZ Calc* can sort on only one field at a time, however. These features (and several others) are all selected from the command menu (see Figure 1).

A list of cells for a function such as SUM or AVG is specified with two periods between the cell coordinates, for example, B3..B15, whereas to format the range, the list is specified with one period (B3.B15). We found this inconsistency somewhat disconcerting.

Windows

EZ Calc is able to split your spreadsheet into two independent windows. The size and position of the windows are adjusted with the GEM window commands.

Blocks of cells can be moved or copied from one window to the other, and windows can be set to scroll independently or together.

Graphics

On the *EZ Calc* disk is an accessory program, EZ Graph, which provides three types of graph: bar, line, and pie. With bar and line graphs, several pieces of data can be "stacked" on top of one another. The graph is shown in a window alongside the spreadsheet (see Figure 2).

EZ Graph provides four general labels on each graph which you can change or remove. If you wish, you can drag labels from the spreadsheet onto the graph—as long as they fit in the allocated space. Data—either a single number or an entire range—can also be dragged from the spreadsheet onto the graph.

An options menu lets you customize graphs with a grid or color. Also, when you are displaying a pie chart, you can select one slice to be pulled partially out of the pie. And you can save graphs and load them back in at a future time.

We had two problems with EZ Graph. First, booting *EZ Calc* is supposed to put EZ Graph under the Desk menu automatically. This procedure doesn't work on a hard disk system, so we had to load EZ Graph as an accessory file onto hard disk C.

Second, the utility to print graphs had a bad case of double vision (see Figure 3). You can, however, easily use the Alternate/Help keys to print the screen in the standard way. Curiously, the spreadsheet print utility worked fine.

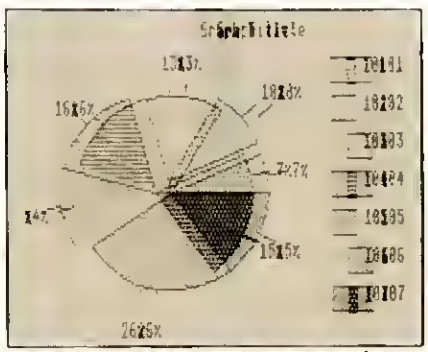


Figure 3. The utility to print graphs didn't.

Extra Features

EZ Calc has two features not found on all spreadsheets: a note pad and a calculator. The calculator is essentially equivalent to a four-function pocket calculator which can be operated with either the mouse or numeric keypad. Although not as handy to use as a real pocket calculator—I always keep one next to my computer—it does allow you to drag an answer from the calculator window directly to the spreadsheet.

The note pad allows you to make notes on specific cells in your spreadsheet. To write a note, you simply click on the note pad feature under the command menu and type your note in the window at the bottom of the screen. Cells containing notes are displayed in bold.

Using EZ Calc

Once you get the hang of *EZ Calc*, it is relatively easy to use. Getting the hang of it is something else again. The controls, as they say in automotive jargon, do not "fall automatically to hand." The several inconsistencies noted above will have you typing too many periods for some ranges and not enough for others, while the menu movement inconsistencies will have you jumping to places you never intended to visit.

When the Return key is pressed, the "time-saving auto cursor feature" automatically moves the cell cursor in the

EZ Calc is more memory efficient than some other spreadsheets; thus the program occupies less space and leaves more room for your data and formulae.

direction of the last cursor arrow key pressed on the keyboard. This may save time when entering a long list of data, but if you want to move around to make corrections or changes—one of the main virtues of a spreadsheet—the auto cursor may inspire you, as it did us, to far more curses than praise.

These problems aside, there was nothing in our spreadsheet benchmark—or probably that a normal business might wish to do—that could not be accomplished with *EZ Calc*. Speed is another matter. Our benchmark calculations took 6.2 seconds to run in Lotus *1-2-3* on an IBM PC clone, 12.5 seconds in *VIP* on an Atari ST, and 15.0 seconds with *EZ Calc*.

Accuracy with *EZ Calc* was absolutely perfect—allowing for the factor of 100 in the present value calculations mentioned above. Counterbalancing the slow speed is tha fact that *EZ Calc* is more memory efficient than some other spreadsheets; thus the program occupies less spaee and leaves more room for your data and formulas.

We would like to conclude by saying that the documentation is outstanding, but unfortunately almost the opposite is true. The 40-page manual consists of a three-page introductory section, five-page tutorial, and 27-page reference section. There are only four illustrations—actually showing only two different features—which is just plain not enough for a new user.

If you are not already familiar with computerized spreadsheets, you most certainly should pick up one of the many books on using Lotus *1-2-3* before trying to use *EZ Calc*. Even if you are an experienced spreadsheet user, you will still probably find yourself spending many hours in experimentation and familiarization before you are comfortable and efficient using *EZ Calc*.

This is not to say that *EZ Calc* is a bad product—it isn't at all—but if Royal Software had spent a few more weeks writing the documentation and testing it with actual users, it would have been of tremendous benefit to new customers.

In summary, *EZ Calc* is a full-featured spreadsheet with all of the functions and features necessary for financial and statistical calculations for home and small business users. Its graphics should be adequate for most users and, if its speed is not dazzling, it is still several orders of magnitude faster than pencil and paper. As it is more memory efficient than some other spreadsheets, *EZ Calc* should have special appeal for users with unexpanded 520ST systems. ■

Puzzles & Problems
Answers

Questions are on page 11.

Family Planning

Assuming that each child has an equal chance of being a boy or a girl, the exact probability is 6.25% or one chance in 16. The problem can also be solved with a simulation program as shown in Listing 1.

Birds Watching Birds

In this problem, it really doesn't matter how many birds are on the wire. If they are spaced randomly, 25% will be unobserved, 50% will be watched by one bird, and the remaining 25% will be looked at by two birds.

The program in Listing 2 will solve the problem. Don't expect it always to come out 25-50-25; you may get 28-44-28 on one run and 23-54-23 on another.

Bills in a Pocket

In the long run, you will receive $5.00 for each robot whether you sell 10, 100, or 1000 robots. The program in Listing 3 will solve the problem.

Baseball Cards

On average, for a set of 50 cards, you would have to buy 225 packets of gum; for 200 cards, you would have to buy 1511 packets. The program in Listing 4 will solve the problem for any size set of cards.

The Vicious Neighbor Problem

The expected number of riflemen left alive is 284 (28.4051%); approximately 460 will be shot once, 215 will be shot twice, 35 will be shot three times, and 6 will be shot four times.

This problem was posed almost 20 years ago and was not solved until very recently. Rongjia Tao and Fa Y. Wu, physics professors at Northeastern University, produced a 20-page proof to solve the problem which they presented at the American Physical Society meeting in New York in March. Articles about the problem are scheduled to appear in forthcoming issues of the *Journal of Recreational Mathematics* and the British *Journal of Physics*. A discussion of the problem can also be found in the April 1987 issue of *Omni*.

Using the bird watching program as a starting point, you ought to be able to write a program to solve the problem. Please send us your program (and the time it takes to complete a run), and we will publish the best one we receive in a forthcoming issue of *Atari Explorer*.

Our Face Is Red Department

In the Spring issue, the answer to Hitchin' a Ride is four minutes, not two minutes. It should have read, "the additional time is the driving distance (4 miles) divided by the driving speed (60 mph), or four minutes."

The answer to Out For a Jog is also wrong in that Brad actually covers 20 feet more *at each end* of the rectangle than Al. Thus he covers 160 feet more per day times 200 days equals 32,000 feet (just over six miles) per year.

In the second part of the anwer, we forgot to multiply 40 times π. Thus, Brad covers $40 \times \pi$ (125.66) more feet per day than Al or 4.76 miles per year.

Thanks to Art Matz of Reading, OH, the first reader to spot these errors. Thanks also to Ken Nagel, Tom Jasinski, and Todd Thedell. It's good to know someone is paying attention!

Listing 1.

```
10 REM PAMILY PLANNING PROGRAM BY O. AHL
20 C=0 : REM ALL BOY FAMILY COUNTER = 0
30 FOR I=1 TO 1000 : REM 1000 PAMILIES
40 B=0 : REM BOY COUNTER = 0
50 FOR J=1 TO 4 : REM POUR BIRTNS
60 IP RND(1)>.5 TNEN B=B+1 : REM A BOY!
70 NEXT J
80 IF B=4 TNEN C=C+1 : REM 4-BOY PAMILY
90 NEXT I
100 PRINT "ALL BOY PAMILIES % = ";C/10
```

Listing 2.

```
10 REM BIRO WATCNING PROGRAM BY D. AHL
20 DIM B(200), L(200)
30 PRINT "NOW MANY BIROS"; : INPUT BO
40 POR I=1 TO BO : REM ITERATE THRU BIRDS
50 B(I)=RND(1) : REM LOCATE BIRD O TO 1
60 NEXT I
70 M=BO : REM FAST SNELL-METZNER SORT
80 M=INT(M/2) : IP M=0 TNEN 160
90 K=BO-M : J=1
100 I=J
110 L=I+M : IF B(I)<=B(L) TNEN 140
120 T=B(I) : B(I)=B(L) : B(L)=T
130 I=I-M : IF I>=1 TNEN 110
140 J=J+1 : IP J>X THEN 80
150 GOTO 100 : REM END OF SORT ROUTINE
160 L(2)=1 : L(BD-1)=1 : REM BIRDS NEXT
170 REM       TO ENDS ARE ALWAYS WATCNED
180 POR I=2 TO BD-1 : REM CLOSEST BIRO
190 IP B(I)-B(I-1)<B(I+1)-B(I) TNEN 210
200 L(I+1)=L(I+1)+1 : GOTO 220
210 L(I-1)=L(I-1)+1
220 NEXT I
230 POR I=1 TO BD
240 IF L(I)=1 TNEN W1=W1+1 : GOTO 260
250 IF L(I)=2 TNEN W2=W2+1 : REM WATCNED BY 2
260 NEXT I
270 WO=BO-W1-W2 : REM WO=UNWATCHED BIRDS
280 PRINT "NOT WATCNEO ";WO;" ";100*WO/BO;"%"
290 PRINT "ONE WATCNER ";W1;" ";100*W1/BD;"%"
300 PRINT "2 WATCNERS  ";W2;" ";100*W2/BD;"%"
```

Listing 3.

```
10 REM BILLS IN POCKET PROGRAM BY D. AHL
20 PRINT "NUMBER OF TRIALS"; : INPUT N
30 V=0 : REM VALUE = ZERO
40 FOR I=1 TO N : REM ITERATE TNRU TRIALS
50 X=INT(6*RND(1)) : REM SELECT 1ST BILL
60 IP X=0 TNEN 110 : REM GOT A $10 BILL
70 Y=INT(5*RNO(1)) : REM SELECT 2ND BILL
80 IF Y=0 THEN 110 : REM GOT A $10 BILL
90 V=V+2 : REM BOTN BILLS WERE SINGLES
100 GOTO 120
110 V=V+11 : REM ONE BILL WAS A $10
120 NEXT I
130 PRINT "AVERAGE VALUE = $";V/N
```

Listing 4.

```
10 REM BUBBLEGUM CAROS PROGRAM BY D. AHL
20 DIM C(200)
30 PRINT "CAROS IN SERIES"; : INPUT N
40 PRINT "NOW MANY TRIALS"; : INPUT X
50 FOR I=1 TO X : REM ITERATE TNRU TRIALS
60 S=0 : REM CARDS IN SET = ZERO
70 POR J=1 TO N
80 C(J)=0 : REM CARD ARRAY = ZERO
90 NEXT J
100 X=INT(N*RND(1)+1) : REM PURCNASE CARO
110 C(X)=C(X)+1 : REM PUT CARD IN FILE BOX
120 IF C(X)=1 THEN 140 : REM 1ST OP CARD X?
130 GOTO 100
140 S=S+1 : REM ADO CARD TO SET TOTAL
150 IF S=N TNEN 170 : REM HAVE ALL CAROS?
160 GOTO 100 : REM IF NOT, PURCHASE ANOTNER
170 P=0 : REM PURCNASE COUNTER = ZERO
180 POR J=1 TO N
190 P=P+C(J) : REM SUM UP PURCHASES
200 NEXT J
210 PRINT P; " CAROS"
220 T=T+P : REM TOTAL PURCHASES ALL TRIALS
230 NEXT I
240 PRINT T/X;" AVERAGE CAROS ";X;" TRIALS"
```

The latest hardware and software announcements for Atari 8-bit and ST computers

New Products

GRAPHICS SOFTWARE

MichTron has announced *GFA Draft*, a two-dimensional CAD program for the Atari ST. The program allows drawings of up to 255 layers, ten of which can be displayed at one time (each in a different color, if desired).

Text can be of different sizes and can run in several directions, as well as being reflected or rotated. All scaling is calculated by the program, and distances can be shown in inches, millimeters, or meters.

Portions of the drawing can be enlarged to allow detail work, and the entire picture can be reduced to increase clarity. Frequently used drawing can be turned into symbols and used again and again. Up to ten of these can be stored on the function keys. $99.95.

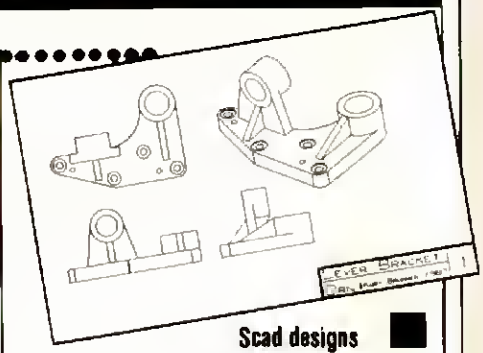
Also new from MichTron for the ST is *GFA-Vector*, a three-dimensional graphics program for the GFA Basic interpreter. The program allows the user to create machine language images and optical effects and include them in his own GFA Basic programs. Objects created with *GFA-Vector* can be rotated about any of the three axes in one-degree increments through any order of rotation. Each object can have up to 1024 defining points and 1024 defining lines. $49.95.

For creation of stand-alone graphics for reports, signs, and other visual displays on the ST, MichTron has introduced *Make It Move*, a program that allows the user to manipulate and animate images created with other paint programs, including *NeoChrome* and *Degas*. $49.95.

MichTron, 576 S. Telegraph, Pontiac, MI 48053. (313) 334-5700.

Reeve Software has released *News Station ST*, a conversion of the company's typesetting program for 8-bit systems. The ST version features a text entry mode, a graphics mode, clip art, compatibility with ASCII and *Degas* files, adjustable margins and line spacing, and an Undo command. It is designed to work with Epson-compatible and ProWriter printers. $29.95.

Reeve Software, 29W150 Old Farm Lane, Warrenville, IL 60555, (312) 393-2317.



Scad designs

Xetec has announced *Scad*, a drafting system for the Atari ST. Features of the GEM-based system include key commands for faster entry, up to 16 drawings at a time, loadable fonts, up to 128 user-defined line styles, 256 user-defined fill patterns, and a coordinate system that can be defined by moving the origin and choosing axis direction. $99.95.

Xetec, Inc., 1804 Arnold Rd., Salina, KS 67401 (913) 827-0685.

Athena II from **Illiad Software** is a full color two-dimensional CAD program for the ST suitable for use in the home, classroom, or office.

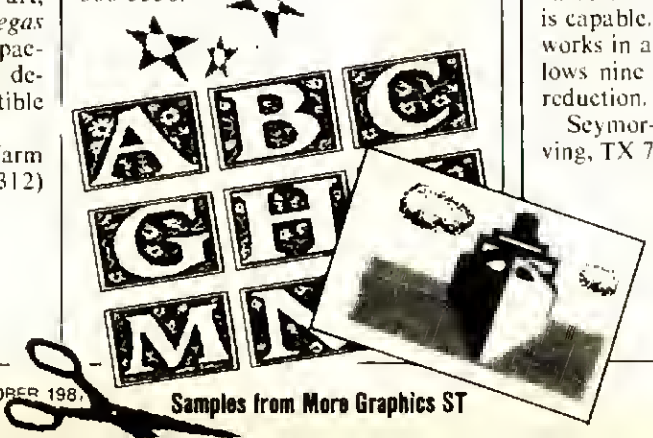
Features include auto dimensioning, isometries, 256 layers, transformation, b-splines, circles, lines, magnification, grids, text, and fills. $99.95.

Illiad Software, 495 West 920 North, Orem, UT 84057, (807) 226-3270.

The Pierstorff Company announces *More Graphics ST*, a collection of 128 clip art icons, symbols, and letters intended to supplement other graphics programs, including *Printmaster*, *Printmaster Plus*, *Degas*, *Degas Elite*, *Typesetter Elite*, *PM Interface*, and *Publishing Partner*. $14.95.

The original version of *More Graphics* is available for 8-bit Atari computers for $12.95.

The Pierstorff Company, 131 W. Main St., Woodland, CA 95695, (916) 666-3530.



Samples from More Graphics ST

UTILITIES

SoftWerx has announced *MaxPak*, an accessory and utility package for the Atari ST that includes a print spooler, RAMdisk with auto-copy, printer enhancer, screen saver, digital screen clock, alarms, file lister, calculator, and keyboard macros. $49.95.

SoftWerx Publishing, P.O. Box 71118, Murray, UT 84107, (801) 272-5623.

Image Scanner For ST

Img Scan is designed to turn any Atari ST and graphics-capable printer into a high-resolution image scanner.

The device is described as "a light pipe that sticks on to the printhead" and takes full advantage of the highest vertical resolution mode of which the printer is capable. It captures 256 gray levels, works in all screen resolutions, and allows nine levels of magnification and reduction. $59.95.

Seymor-Radix, P.O. Box 166055, Irving, TX 75016.

DESKTOP PUBLISHING SOFTWARE

Migraph has released the *Easy-Draw Supercharger*, a companion product for *Easy-Draw 2.0*, Migraph's entry in the desktop publishing market.

The *Supercharger* allows *Easy-Draw* to load bit images from *NeoChrome* and *Degas*, allowing users to take advantage of the substantial bit-image clip art library already available for the ST. Also available for use with *Easy-Draw* are three additional software packages from Migraph. The first, *Font Pack 1*, comes in 9- and 24-pin versions. $39.95.

Personal Draw Art, the second new package, contains more than 100 images, including vehicles, borders, and symbols. *Technical Draw Art*, for those who use the program to create technical illustrations, floor plans, wiring diagrams, etc., contains symbol libraries for electrical schematics, hydraulic and piping layouts, flow charts, and more. The draw art packages retail for $29.95 each.

Along with a Postscript driver, Migraph has released printer drivers for the HP Laserjet Plus and Series II, Star NB series, NEC P series, and Epson LQ series printers.

Migraph, 720 S. 33rd St., Ste. 201, Federal Way, WA 98003, (206) 838-4677.

Image produced with Supercharger

Okidata 180

Okidata Printer

At the Summer Consumer Electronics Show, Okidata introduced a new dot matrix printer aimed at the home user/home office market.

With standard Commodore serial and Centronics parallel interfaces, the Okidata 180 supports all Commodore and Epson control codes. Print speed is 180 cps in high speed draft mode, 120 cps in utility mode, and 30 cps in near letter quality mode.

The Okidata 180 features enhanced, emphasized, and expanded printing, superscripts, subscripts, underlining, and bit-image graphics to 144 × 288 dots per inch. Suggested retail price is $329.

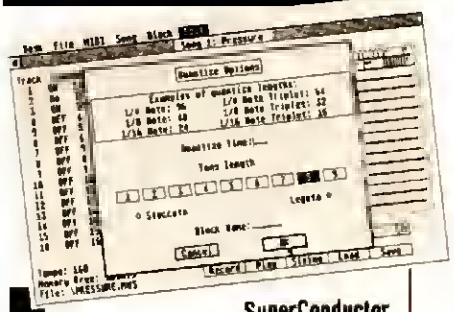
Okidata, 532 Fellowship Rd., Mount Laurel, NJ 08054. (609) 235-2600.

MUSIC SOFTWARE

Electronic Arts has anounced *Music Construction Set* for the Atari ST. Features added especially for the ST include MIDI In, MIDI Out, "Jukebox" play mode, and waveform editing. Complete musical notation, including whole to thirty-second notes and rests, dotted notes, ties, triplets, and quintuplets. Notes can be modified with flats, sharps, or naturals, or by raising or lowering by an octave. The program plays three voices simultaneously and takes full advantage of the built-in MIDI capability of the ST. $39.95.

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. (415) 571-7171, (800) 245-4525. (800) 562-1112 in CA.

MichTron has announced *SuperConductor*, a 16-track MIDI sequencing package that can filter, transpose, edit, mix, and quantize (autocorrect) music played through a synthesizer that has been attached to the MIDI ports of the Atari ST.



SuperConductor

The "Block" structure of the program allows edits to be made with a word processor, and its Systems Exclusive Mode allows data to be transferred from the synthesizer to the computer.

SuperConductor can also send rhythm codes to drum machines. $79.95.

MichTron, 576 S. Telegraph, Pontiac, MI 48053, (313) 334-5700.

ENTERTAINMENT SOFTWARE

Infocom announces *Stationfall*, author Steve Meretzky's sixth interactive fiction release. In this game, which is available for both 8-bit ($34.95) and ST ($39.95) Atari computers, you join the robot Floyd in an adventure that puts the survival of the galaxy in your hands. The package includes three assignment forms, a set of blueprints for the Gamma Delta Gamma class Deep Space Station, an official sew-on Stellar Patrol patch, and a coupon you can send in to get *Planetfall* for $14.95.

Stationfall

Infocom, Inc., 125 CambridgePark Dr., Cambridge, MA 02140, (617) 492-6000.

Sublogic has released *Scenery Disk #7* for Atari 8-bit and ST computers. The disk, which must be used in conjunction with *Flight Simulator II*, covers the East Coast of the United States in detail, from Washington, DC, down through Key West, FL.

Sublogic Corporation, 713 Edgebrook Dr., Champaign, IL 61820, (217) 359-8482, (800) 637-4983.

Questbusters is a newsletter for adventure fans. In addition to news and reviews of adventure games, the publication offers "walkthrus," step-by-step solutions to popular games. A one-year (12-issue) subscription to the newsletter costs $16.00. Send an SASE and mention *Atari Explorer* to obtain a free sample issue.

Questbusters, 202 Elgin Ct., Wayne, PA 19087.

Artworx has released *Bridge 5.0*, an enhanced version of *Bridge 4.0* for the Atari ST. The new program features improved bidding based on the five-card major approach and employs both Blackwood and Stayman conventions.

Minigolf

It will store interesting hands on disk for replay at a later date and gives the user the option of choosing the number of high-card points to be dealt. $34.95.

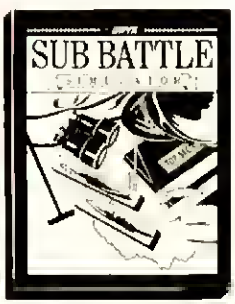
Also available for the ST is *Minigolf*, a miniature golf game that offers three different courses and an editor with which the player can design custom courses. $19.95.

Artworx Software Company, 1844 Penfield Rd., Penfield, NY 14526, (716) 385-6120, (800) 828-6573.

Software Exchange announces a professional basketball handicapping program for Atari 8-bit computers. Information needed to handicap weekly NBA games can be found in daily newspaper sports sections, and the analysis is performed in about five minutes. $49.95.

Software Exchange, P.O. Box 5382, West Bloomfield, MI 48033, (313) 626-7208.

Epyx introduces *Sub Battle Simulator* for the Atari ST. The object of the game is to command a World War II submarine in either the Atlantic or Pacific, complete the assigned mission, survive, and return to home base. There are 14 American and 36 German missions from which to choose—all based on historical data.



Sub Battle

Epyx, P.O. Box 8020, Redwood City, CA 94063, (415) 369-0606.

Logical Design Works announces a new line of games for the Atari ST under the California Dreams trademark. *Vegas Gambler* offers slot machine, blackjack, poker, and roulette simulations in one package ($34.95). *Vegas Craps* is a simulation of the game as played in Las Vegas ($34.95).

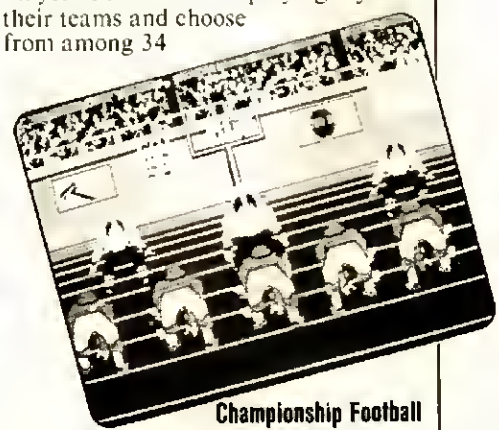
Logical Design Works, Inc., 780 Montague Expy. #403, San Jose, CA 95131. (408) 435-1445.

Mindscape announced two new games for the ST at the Summer Consumer Electronics Show. *Plutos* is a space war shootout with sound effects and high-resolution, smooth-scrolling graphics. The object of the game is to destroy the mother ship's defenses and progress to higher, more difficult stages.

Q-Ball is a three-dimensional pool game featuring eight pockets, the absence of gravity, one- and two-player options, and 262,144 different viewing angles. $29.95 each.

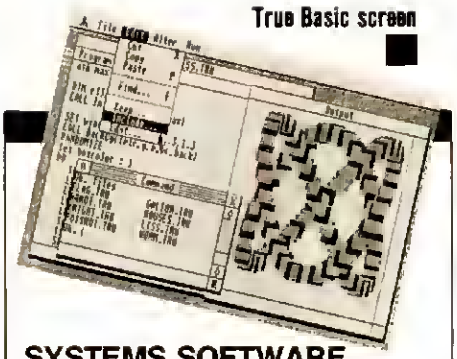
Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062.

Activision has released *GFL Championship Football* for the Atari ST. The program gives the player an on-the-field perspective with scrolling animation. Players can select the playing style of their teams and choose from among 34 defensive plays, 21 defensive alignments, kick-offs, field goals, and punts. $44.95.



Championship Football

Activision, P.O. Box 7286, Mountain View, CA 94039, (415) 960-0410.



True Basic screen

SYSTEMS SOFTWARE

True Basic Inc., announces version 2.0 of True Basic for the Atari ST. Because True Basic is a compiler, it is said to be "significantly faster" than ST Basic.

Version 2.0 offers modules, which can be used within a program to facilitate data sharing between program segments or separately compiled and stored as libraries for use with other programs.

True Basic Inc., plans to release a number of libaries for use on the Atari, including 3-D Graphics, Sorting and Searching, the Advanced String Library, and the Mathematician's Toolkit.

True Basic Inc., 39 S. Main St., Hanover, NH 03755, (800) TRBASIC.

Computer Crossware Labs has announced Real Basic, a Basic interpreter for the Atari ST. Fully compatible with ST Basic, Real Basic is said to run 20 to 100 times faster.

Real Basic contains an in-line Motorola-compatible assembler that allows the user to switch to assembly language without leaving the interpreted Basic environment.

In addition to supporting the ST Basic editor commands, the Real Basic editor supports some of the Micro Emacs command set. And Real Basic features such extended graphics instructions as PLOT, SETCOLOR, BOX, and PBOX. $69.95.

Computer Crossware Labs, 516 Fifth Ave., Ste. 507, New York, NY 10036. (212) 677-3686.

Eidersoft has launched Fast Basic, a Basic interpreter for the Atari ST. Features include more than 400 key words, built-in 68000 assembler, speech synthesizer, mathematical precision to 7 or 15 digits, GEM-based editor, strings up to 64K in length, and a 400-page manual. $79.95.

A ROM cartridge that holds the Basic interpreter and frees memory for larger programs is available to registered owners for about $55.

Eidersoft USA, Inc., P.O. Box 288, Burgettstown, PA 15021. (412) 947-3739, (800) 648-9191.

PRODUCTIVITY SOFTWARE

Regent Software has released *The Inventory Manager*, an inventory control system for the ST that offers custom reporting and sales projections based on sales history. The program can handle up to 40,000 parts and gives purchasing projections based on seven user-definable parameters.

Additional features include instant access to any part, 16-digit part numbers and descriptions, up to 254 vendors, order generation, obsolesence reports, zero on-hand reports, and inventory analysis reports.

Regent Software, 7131 Owensmouth, Ste. 45A, Canoga Park, CA 91303, (818) 882-2800.

Trimbase from **MichTron** is a data management system that is designed to work like an ordinary card filing system. It maintains a set of record cards on which can be written such information as names, addresses, personal or business details, class and exam results, birthdays, or any other information that is important to the user.

The operational relations of *Trimbase* allow the user to extract the information needed from one file and then use it to get more detailed information from another file. Reports can be produced in either tabular or text form. $150.

MichTron, 576 S. Telegraph, Pontiac, MI 48053. (313) 334-5700.

Progressive Peripherals and Software has released *Logistik Senior* for the Atari 1040 ST and *Logistik Junior* for Atari 510 and 1040 ST computers. Both packages offer project management and database functions integrated into a spreadsheet environment. *Logistik Senior* adds presentation quality graphics to the package.

Both programs allow the user to compute the critical path of a project; specify scheduling constraints; produce Gantt charts, histograms, and project calendars; and perform what-if operations. *Logistik Junior* sells for $99.95 and *Logistik Senior* for $149.95.

Progressive Peripherals and Software, Inc., 464 Kalamath Dr., Denver, CO 80204. (303) 825-4144.

What Next?

After the new wears off, many personal computers wind up gathering dust in a closet. Don't let your Atari be one of them.

Why did you originally buy an Atari computer? To do word processing? To compose music? To manage your business? To play games? Chances are, whatever your initial reason for buying an Atari, you've discovered that it has many additional capabilities and potential applications.

The flip side of the coin is that you've probably experienced some frustration as well. Maybe your word processing package won't do subscripts or underlining. Perhaps your database won't sort on as many fields as you need. Or, it could be that when you write a program, your whole system acts user-hostile.

Depending upon the balance between your satisfaction and your frustration, you may continue to use your computer or set it aside. But there is a better way: **Atari Explorer** magazine.

As the premier magazine for Atari computer owners, it is our responsibility to make sure that you get the most out of your computer. To us, that means making sure that your Atari does more than you bought it to do, more than friends and associates' computers do, and, indeed, more than you ever imagined that a computer could do.

To make sure that you get the most out of your computer, **Atari Explorer** brings you objective, in-depth reviews of hardware and software; up-to-date information about new products; practical tutorials; stimulating columns; thought-provoking articles; and valuable inside information.

Hard-hitting Evaluations

At **Atari Explorer**, we obtain new peripherals and software packages as soon as they are released. We put them through their paces in our on-site laboratory and also in the environment for which they are intended: home, office, lab, or school.

Our evaluations are unbiased and accurate. We are not afraid to call a spade a spade or a lemon a lemon. Our first obligation is to you, our readers, and editorial excellence and integrity are our highest goals.

Practical and Stimulating

We know that some of our readers are beginners and others are experts. Thus, it is our responsibility to make what we publish both comprehensible to newcomers and interesting to veterans. That does not necessarily mean that the material is simple; we know you like to be challenged. What it does mean is that we provide the inexperienced user with every possible means to seize the subject matter and make it his own.

However, we don't want the experts to be bored, so although articles are accessible to beginners, they are theoretically non-trivial, cover topics in depth, and present information on more than one level.

At **Atari Explorer**, we are intensely interested in all aspects of computing. Ours is the magazine of pragmatic applications, communicative graphics, stunning animation, mind-expanding games, and realistic simulations. We take our business seriously, but we have fun too. We are convinced that you will, too, when you go exploring with the **Atari Explorer** family.

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Binary Basic

Tips for better bit-twiddling in Atari 8-bit Basic

As one probes deeper into the mysteries of Basic programming on an Atari 8-bit system, knowledge of binary operations becomes ever more important. PEEKs and POKEs are the means by which all the higher-level functions of the machine—player/missile graphics, CIO, and sound—are controlled.

Unfortunately, Atari Basic doesn't provide powerful tools for handling values in binary form. Functions that ean be used to test individual bits in a value—the true *bytewise-Boolean operators*—are lacking. While Basic supplies so-called *logical* operators, these are but shadows—capable of distinguishing between zero (logical "false") and non-zero (logical "true"), but incapable of bit-level manipulations.

However, with a little ingenuity, it is possible to use the facilities Atari Basic does put at your disposal to do some pretty fair bit-twiddling. Here's how:

Bit Testing

A binary byte contains eight bits, each of which represents a power of 2 from 0 to 7. To determine the decimal value of a binary byte, you look to see which bits are *set*—that is, which bits appear as 1's—and add up the powers of 2 corresponding to their positions, according to Table 1.

Thus, to convert the binary value 10011001 to decimal, you note that bits 0, 3, 4, and 7 are set, and work out the following expression:

$2^0 + 2^3 + 2^4 + 2^7$
$= 1 + 8 + 16 + 128 = 153$

The rightmost bit in a byte—bit 0—represents the "1's place" in the value of the byte. It is unique in that it represents a power of 2 ($2^0 = 1$) that is not an even number.

What does this imply? The sum of even numbers (represented by bits 1 through 7) is always an even number, and adding 1 (bit 0) to an even number always produces an odd number. Thus, for any value, you can test to see if bit 0 is set by determining if the number is even (it is not set) or odd (it is).

The usual Basic formula for determining whether a number, N, is even or odd employs the INT function. If N/2 = INT(N/2) then the number is even; otherwise, it is not.

Testing the leftmost bit in a byte value (such as the value returned by a PEEK) is just as easy. If the top bit is not set, the total value of the byte cannot be greater than 127 (bits 0-6 set). If it is set, the value will always be 128 or greater.

It is a little more difficult—but far from impossible—to test bits other than the leftmost. We can use one of a number of different methods.

What happens to a base-ten (decimal) number, say 15,420, when you divide it by 10? You get 1542—that is, the digits in the decimal representation shift to the right one place. Likewise, when you divide a number by 2, the bits in the binary representation of that number shift right by one place. For example, 162 (binary 10100010)/2 = 81 (binary 01010001). Note how the bits have shifted.

Since we already know how to test the rightmost bit in a value, we can apply our knowledge of "divide-by-2-shift-right" to shift each bit in a value into the rightmost position one after the other, testing each in turn. The short Basic

By JOHN JAINSCHIGG

BIT ANALYZER Listing 1.

ATARI KEY

- Any Atari 8-Bit Home Computer
- Atari Basic

```
10 INPUT N
20 BIT=0
30 PRINT "BIT ";BIT;" IS ";
40 IF N/2=INT(N/2) THEN PRINT "NOT SET.":GOTO 60
50 PRINT "SET."
60 IF N>0 THEN N=INT(N/2):BIT=BIT+1:GOTO 30
```

Listing 2.

```
10 PRINT "INPUT VALUE";
20 INPUT N
30 PRINT "INPUT BIT NUMBER FOR TESTING";
40 INPUT BIT
50 PRINT "IN VALUE ";N;", BIT ";BIT;" IS ";
59 REM --SHIFT RIGHT AND ELIMINATE REMAINDER--
60 Q=INT(N/2^BIT)
70 IF Q/2<>INT(Q/2) THEN PRINT " NOT ";
80 PRINT "SET.":GOTO 10
```

Table 1. Conversion of binary values to decimal values.

Bit Number	7	6	5	4	3	2	1	0
Power of 2	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Decimal Value If Bit is Set	128	64	32	16	8	4	2	1

program in Listing 1 accepts a positive integer, N, as input and informs you whether each of the bits in the binary representation of that number is set or not.

There is a problem with this method of bit-testing, however. It is inefficient for testing individual bits—getting a given bit into the rightmost position may take several shifts. Luckily, there is a more efficient solution.

Consider: we already know that we can shift a byte right by one place through division-by-2. What if we want to shift it right by two, three, or more places? Simple—we just divide it by 2 the appropriate number of times, or, more efficiently, we divide it by 2 raised to the appropriate power.

For example—binary 32 is 00100000. Suppose we wanted to shift it right by five places? We can divide it by 2 five times, giving intermediate binary values of 00010000, 00001000, 00000100, and 00000010 before ending up with 00000001. Or, we can divide it by 2^5(32), giving us the expression:

$32/2^5 = 32/32 = 1$ (binary 00000001).

Thus, by applying division by the appropriate power of 2, we can shift a byte rightwards by any number of places in one fell swoop, putting any bit we like into the rightmost position for testing. The short program in Listing 2 lets you input a value, N, and a bit number, BIT, and uses the above method to tell you if the given bit is set in the value you have entered.

Note that the INT function is used in line 60, to eliminate any remainder from the value. For example, were we to shift the value 35 right by five places (testing bit five), a simple shift-by-division-by-appropriate-power-of-2 would leave us with $35/2^5 = 35/32 = 1.09375$ (binary 00000001.00101). We eliminate the remainder, because it can, in certain situations, screw up subsequent calculations. ■

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TV Fixer!

This Atari 8-bit program can help you adjust your TV or monitor for best picture quality

By PHILIP W. BATE

Poor color quality, convergence, and image centering are problems that eventually affect most color TV sets and composite video monitors. Problems of this sort can often be fixed by adjusting external and internal controls, using the proper tools.

Unfortunately, it is difficult or impossible to do these adjustments effectively with test images generated by a regular TV or VCR. Instead, professional repairpeople use a device called a *bar/dot generator* to create stable, color-pure, and geometrically precise test patterns.

However, your Atari 8-bit computer can do just as well, and at considerably less cost, using the program in Listing 1. Using the different test patterns provided by this program, and with the proper tools, most hackers can easily adjust their TVs and other monitors.

CAUTION

TV sets and monitors contain potentially hazardous high voltage current. If you have no experience with electronics and no knowledge of proper safety precautions, do not attempt to perform the adjustments described here without assistance.

Experienced hardware hackers should remember the following:

1. Remove all rings and other jewelry prior to working with electronic equipment.

2. Work only with insulated or, preferably, non-conducting tools, use rubber gloves, and wear rubber-soled shoes.

3. Work slowly and carefully in a clean, well-lighted, dry work area.

4. While working, pay attention to labels and schematic markings that may warn of potential shock hazards.

5. Avoid letting your tools accidentally form bridges between components or circuit-board traces.

6. If practical, work one-handed, with your other hand in your pocket. This is a good discipline for working with high voltages, because (assuming you are not grounded elsewhere) it helps prevent you from completing a circuit with your own body.

7. Touch nothing without a specific and well-understood reason for doing so; if you are not sure of the purpose of an operation or cannot recognize a component, don't mess with it!

Before starting, we suggest that, if possible, you obtain a copy of the service manual for the equipment you are attempting to adjust. Schematics and procedures contained in this manual will greatly facilitate identification of relevant components and help you avoid hazards.

We also suggest that the adjustments described here be carried out only on newer-model, solid-state equipment, as this type of equipment offers far less shock danger than older sets.

Setting Up

Non-conducting plastic tools for safely and accurately adjusting trim potentiometers and variable controls in a TV or monitor are available from Radio Shack and other dealers. Buy Radio Shack part # 64-2220 or equivalent.

The rest of your tool kit need consist only of a proper set of insulated screwdrivers (for removing casing and other screws), a pair of electrician's rubber gloves, and perhaps a set of plastic (not metal!) forceps for retrieving small parts or handling small objects inside the set.

The program is self-explanatory, with a menu of choices, each representing a different type of test screen image. The first three items on the menu are color screens, which will assist in testing color purity.

Next comes a series of dot and bar patterns for use in testing *alignment*, *centering*, and *convergence*. A circle pattern follows for testing *linearity*—the ability of your set to display objects without "stretching" them horizontally or vertically. Last is a grey screen for further color checks.

After entering and SAVEing the program, RUN it using the TV or monitor for output. Go through all the tests, noting where problems exist.

Vertical Adjustments

To test picture height and linearity, you use the circle pattern. When correctly adjusted, the screen should show a true circle, equal in height and width. (For monitors that will be used primarily for text, it is sometimes better to adjust things so that a slight vertical oval is displayed, increasing the height of each row slightly.)

Once picture height has been adjusted to suit, you can adjust Vertical Linearity so that the picture is centered vertically on the screen. Since picture height and linearity controls affect one another, you will have to go back and forth, adjusting each in turn until you have a good even circle (or slight oval, as desired).

Grey Scale Adjustments

Set the external brightness, contrast, color, and tint controls to their mid-range point. Locate the screen or drive controls (usually only two—often green and blue, with red set internally).

Find the three background or *bias* controls, and set them fully counter-clockwise. These controls are often adjustable without removing the back of the set. On some smaller sets, however, they may be mounted on a circuit board right on the socket of the TV tube.

Note: there may be potential shock voltages around this socket circuit. If so, the danger points will usually be protected against accidental contact by a cardboard or paper shield. To be safe, avoid touching any part of the socket circuit except the control shafts themselves.

Use the grey screen routine, setting it to the brightest possible luminance (white) using the spacebar. Adjust the green or blue screen (drive) controls so that you get a good, overall light grey or white picture.

Now use the spacebar to reduce the luminance to dark grey—just barely brighter than black—and adjust the background controls so that the image is good and clean—free of any color.

If you are adjusting a TV set or have access to a TV tuner that permits you to display a TV image on your monitor, tune in a station and cut the color out either by using the chroma-cutout switch or by fine-tuning the receiver for fringe reception. Check this picture for good blacks, whites, and greys. Adjust screen and background controls further, if necessary.

Centering and Color Purity

With just a little care, it is quite simple to adjust the size and center the picture on the screen in the horizontal direction. Most TV sets "overscan" the picture slightly—as a result, a column or two of computer type may be lost on one margin or the other.

It is safest to adjust picture size with the power off and the set unplugged, making adjustments in small increments and turning the set on between adjustments to check results.

With the set unplugged, remove the back cover, and locate the *yoke coil* on the neck (the slender rear portion) of the picture tube.

By moving the yoke coil forward, you can shrink the size of the picture on the face of the tube; moving it backward will expand the picture. By moving it around or sideways or up and down, the picture can be centered.

To make these adjustments, start by marking the present position of the coil with a grease pencil. Then loosen slightly the screws or clamps that bind the coil in position—just enough so that you can move the coil with some slight force, but not enough so that it slips when placed in a particular position.

Now plug the set in and observe the picture to see how it may need to be adjusted. Use the Main Menu screen as an example of text, noting the width of screen borders as a check to centering. Then unplug the set again, and make small adjustments to the position of the control yoke.

After each adjustment, re-connect the set and check centering with the

ATARI KEY

- Any Atari 8-bit home computer
- Atari Basic

```
10 REM ***TV ALIGNMENT BY COMPUTER***
20 REM ***by Philip W. Bate PhD
100 REM ***MAIN MENU***
110 ? CHR$(125):POKE 82,6:GRAPHICS 0:POKE 752,1:? :? "
 **MAIN MENU**"
120 ?  ?:"1 - RED SCREEN FOR PURITY ADJ"
130 ? :? "2 - GREEN SCREEN"
140 ? :? "3 - BLUE SCREEN"
150 ? :? "4 - DOT PATTERN"
160 ? :? "5 - VERTICAL BAR PATTERN"
170 ? :? "6 - HORIZONTAL BAR PATTERN"
180 ? :? "7 - CROSSHATCH BARS"
190 ? :? "8 - CIRCLE PATTERN"
200 ? :? "9 - GREY SCREEN"
210 ? :? :? "ENTER YOUR CHOICE";
220 CLOSE #1:OPEN #1,4,0,"K:"
230 GOSUB 1000
240 POKE 82,0:ON A-48 GOTO 250,280,310,340,390,440,490
,550,660
250 ? CHR$(125):SETCOLOR 4,3,6:SETCOLOR 2,3,6
260 GOSUB 1000
280 ? CHR$(125):SETCOLOR 4,12,4:SETCOLOR 2,12,4
290 GOSUB 1000
310 ? CHR$(125):SETCOLOR 4,8,4:SETCOLOR 2,8,4
320 GOSUB 1000
340 REM ***DOT PATTERN***
350 ? CHR$(125):SETCOLOR 1,0,12:SETCOLOR 2,0,0:SETCOLO
R 4,0,0
360 FOR X=0 TO 39 STEP 2:FOR Y=0 TO 23 STEP 2:POSITION
 X,Y:? ".":NEXT Y:NEXT X
370 GOSUB 1000
390 REM ***VERTICAL BARS***
400 ? CHR$(125):SETCOLOR 1,0,14:SETCOLOR 2,0,0:SETCOLO
R 4,0,0
410 FOR X=0 TO 39 STEP 2:FOR Y=0 TO 22:POSITION X,Y:?
CHR$(2):NEXT Y:NEXT X
420 GOSUB 1000
440 REM ***HORIZONTAL BARS***
450 ? CHR$(125):SETCOLOR 1,0,14:SETCOLOR 2,0,0:SETCOLO
R 4,0,0
460 FOR X=0 TO 38:FOR Y=0 TO 23 STEP 2:POSITION X,Y:?
"_";:NEXT Y:NEXT X
470 GOSUB 1000
490 REM ***CROSSHATCH PATTERN***
500 ? CHR$(125):SETCOLOR 1,0,14:SETCOLOR 2,0,0:SETCOLO
R 4,0,0
510 FOR X=0 TO 39 STEP 2:FOR Y=0 TO 22:POSITION X,Y:?
CHR$(124):NEXT Y:NEXT X
520 FOR X=0 TO 37 STEP 2:FOR Y=0 TO 22 STEP 2:POSITION
 X,Y:? CHR$(19);CHR$(18):NEXT Y:NEXT X
530 GOSUB 1000
550 REM ***CIRCLE***
560 GRAPHICS 8+16:POKE 752,0:SETCOLOR 4,9,4:COLOR 1
570 X=160:Y=96:PLOT 20,Y:DRAWTO 300,Y:PLOT X,5:DRAWTO
X,189:RS=25:ST=0.05:FOR I=0 TO 6.29 STEP ST
580 R1=3.7
590 R9=RS*R1
600 X9=R9*COS(I):Y9=R9*SIN(I)
610 PLOT X+X9,Y-Y9
620 PLOT X+X9+1,Y-Y9
630 NEXT I
640 GOSUB 1000
660 REM ***GREY SCREEN***
670 FOR B=0 TO 14 STEP 2:SETCOLOR 2,0,B
680 ? CHR$(125):POSITION 2,11:? "PRESS SPACEBAR TO CHA
NGE BRIGHTNESS"
690 GOSUB 1000
700 IF A=32 AND B=14 THEN 670
710 IF A=32 THEN NEXT B
720 GOTO 100
1000 A=PEEK(764):IF A=255 THEN POKE 77,0:GOTO 1000
1010 GET #1,A:IF A=155 THEN 100
1020 RETURN
```

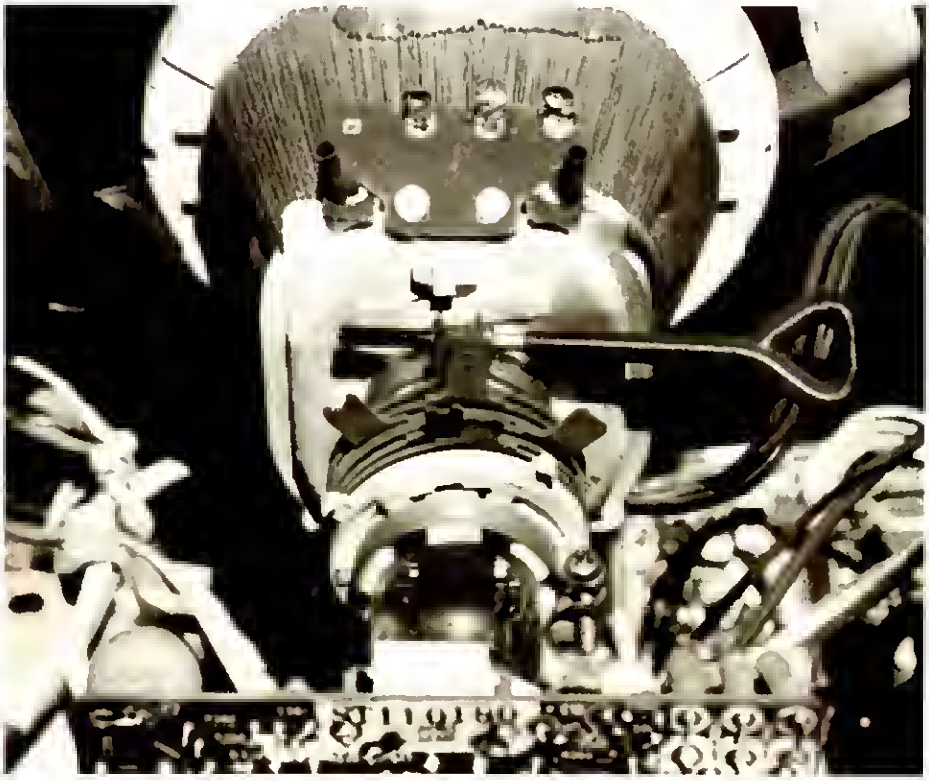


Figure 1. This rear view of a typical 19″ color TV set shows the yoke coil (held in place by a large turn key) and color purity and convergence controls on the neck of the picture tube.

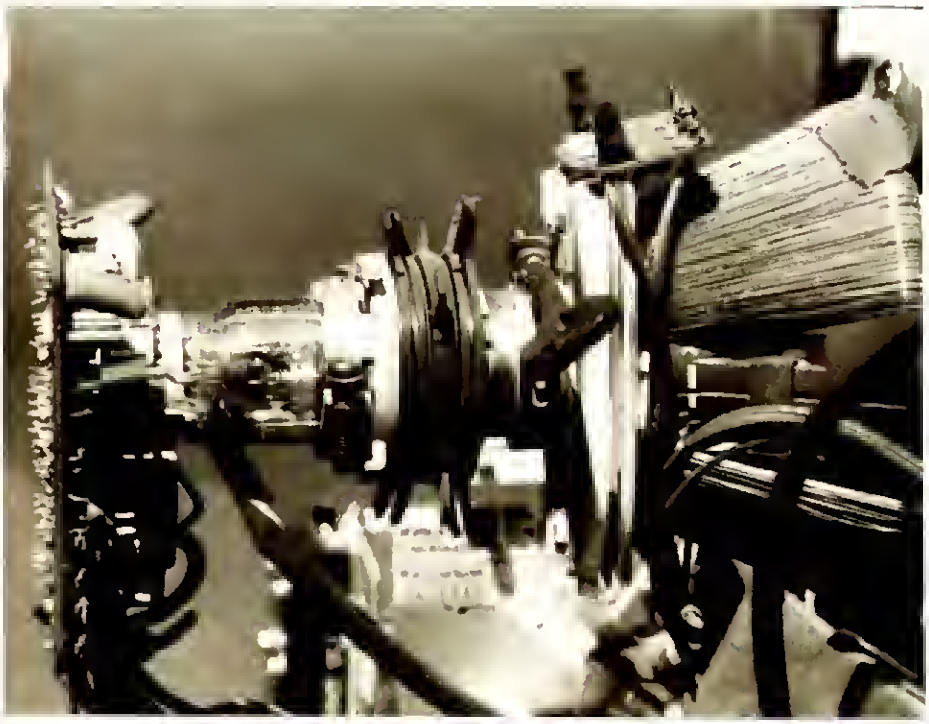


Figure 2. A side view of the purity and convergence tabs on the picture tube.

menu screen. Also use the Red Screen function to check for overall red color uniformity, as the position of the yoke also affects this adjustment. You may have to compromise between picture size and centering and red color purity to some extent.

Because adjusting the yoke coil also affects the beam centering onto the phosphor dots on the screen, a color purity adjustment may be necessary after moving the yoke coil as described above.

Often, only minor adjustments of the Color Purity magnets or tabs are required. These are two circular magnets in an assembly clamped to the neck of the TV tube behind the yoke coil. (See Figure 2.) Sometimes another set of tabs, usually three or more, lies closeby on the neck of the picture tube. This set of tabs comprises a convergence assembly and should be left alone at present.

With the set on, use the program to obtain a red screen and check it for uniformity of color. If it is uniformly red over the entire screen, no purity adjustments are necessary. However, after a yoke coil adjustment, there will usually be some variation in color purity over the face of the image.

Try to get a uniform red color by adjusting the tabs on the purity magnets, both around the neck of the tube and towards front and back. Be careful to avoid touching other components. If you cannot get a uniform red color, further adjustment of the yoke coil will be necessary, as described above.

When working out the above compromise among centering, picture size, and color purity, keep in mind what the set will be used for. If you intend to use the set primarily as a broadcast receiver or VCR monitor, centering is likely to be less important than color purity. As mentioned above, most TV sets are adjusted to overscan slightly at the edges of the picture, and some are not easily adjusted to display a smaller picture while keeping good color purity.

On the other hand, if the set is to be used primarily as a computer monitor, centering will be of greater importance than color purity.

Once good red color purity has been established, use the blue and green color screens to check purity with these colors as well. If you find that it is impossible to get good red, green, and blue color purity, you may wish to check into getting the TV tube *degaussed* (demagnetized)—though this is seldom necessary with modern sets, as demagnetization

circuitry is usually built in.

If you continue to have inexplicable difficulties in achieving proper adjustment, check around your set to make sure that there is no strong source of magnetic interference in the vicinity.

When you have the yoke and other controls set the way you want them, tighten down the yoke clamps (slowly and carefully, because you may be exerting pressure against a glass tube!) to hold the yoke firmly in its new position.

Convergence Adjustments

Put the dot pattern on the screen, and observe carefully. You will see that the white dots are made up of smaller red, green, and blue dots combined to make white. Where the three beams are not converging correctly, one or another primary color (rather than white) will be emphasized.

Depending on the set, a variety of different approaches may be required to adjust this beam convergence. On some sets, there is a small sub-chassis that has several (usually between 9 and 12) controls on it. This is usually mounted near the top of the housing and can be detached and placed so that it can be adjusted while observing the picture. Convergence controls in other sets may be found on the neck of the picture tube, as noted above.

On some smaller sets, a group of circular magnets is clustered at the neck of the picture tube in a manner similar to the purity magnets discussed above. You can move these magnets freely if you loosen the assembly that clamps them to the neck of the tube.

Whichever control system your set employs, it is important to mark the position of all controls and magnets using a grease pencil or white enamel pen prior to making adjustments. If you make a mistake, these marks will be helpful in restoring the original positions of the controls.

Adjust the controls with power on, looking to get the whitest dots (indicating best convergence) you can. If your set employs a magnet assembly, adjust the magnets two at a time to get best convergence over the entire screen.

The process will take some experimentation—moving the magnets together around the neck of the tube, then separating the tabs. By trial and error, you will discover what each pair of magnets does, and be able to get a fair to excellent convergence over the entire screen. You may find the horizontal and vertical bar and crosshatch patterns useful for help in making this adjustment. Again, be careful when working with the power on!

If your set has a small separate circuit board bearing convergence controls, unscrew it from its position at the top of the cabinet and place it so that it can be adjusted from the front of the set. Adjust each control in turn, observing the center and sides of the picture to see what each control does. Again, crosshatch and vertical bar patterns will probably be of some help.

Convergence is the most difficult of adjustments and does affect the other adjustments to some extent. Some back and forth repetition of other adjustments may be necessary, but with patience, a good convergence can be obtained on almost all TV sets. ■

Teletalk

By JOHN J. ANDERSON

What ho, telecommunicators. How's it hanging up, today? It is my hope that your lines are clean and your handshaking enabled. We're going to make a bit of a diversion this month, and I hope you don't mind. We're going to talk a little bit about what it means to be a thoughtful human being.

Like Grand Central Station, Riverfront Stadium, and Ghiradelli Square, information services are public places. As such, basic rules have been established to make interaction there as pleasant as possible.

The overwhelming majority of visitors to bulletin boards and information services do their utmost to be considerate and fair. They treat their visit as a special occasion and go out of their way to make the people with whom they interact feel good about the interaction. This is courtesy. This is good will. This is being a thoughtful human being.

Unfortunately, not everyone is so thoughtful. And somewhat to my original surprise, just because someone has had the inspiration, the motivation, and the wherewithal to purchase a microcomputer and a modem, does not automatically ensure that the person is in any way enlightened. As a matter of fact, some of the rudest and nastiest interactions I have ever witnessed have taken place online.

Electronic Graffiti

I was at first at a total loss to explain such a thing. There is something about being online that brings out the savage in a small percentage of us. Something to do with the anonymity of communication via keyboard. There is an element of the graffiti artist in all of us, I'm sure.

But only a small percentage of us possess the artistic talent as well as the perverse dedication to invest in spray cans of Dayglo. Another, surely smaller, fraction of this group, perhaps those who lack all artistic talent but are oversupplied with perversity, buy microcomputers and modems.

Yes, there is what can be chalked up to "immaturity." Four-letter words, anonymous scribblings on this or the other bulletin board. Usually the work of a "youngster" in a mischievous mood. I can understand that.

Then there are anonymous diatribes, personal attacks, orchestrated by a venomous writer who has for some reason (usually spurious) been incensed. My long-time colleague Sheldon Leemon recently remarked to me that until recently, he had not been aware that there was an electronic equivalent of a paper letter "written in crayon on brown paper." Online, he continued, this sort of letter is written with the caps lock on, so the entire missive seems to shout at you. Such letters are always rife with spelling errors, grammatically incomprehensible, and formatted very eccentrically.

Even this can be laughed off, as our electronic skins thicken and we come to grips with the fact that there is a nasty streak in some people that we have to deal with. The thing that is most unfortunate is that such behavior legitimizes the need for censorship, and censorship online has become a very thorny issue.

Digital Censorship

When I was WIZ of the *Creative Computing* SIG on CompuServe, I laid down some very basic rules and stuck to them. First transgressors got an alert, followed by a warning, and the third time they were locked out. Any message that used the F-word was deleted, as were personal attacks, and uploads of pirated software. And that was it. I left everything else up, even though it occasionally caused me great distress. Something, I felt, concerning freedom of speech.

I'm not sure just why I was so shocked when I discovered how different the rules are elsewhere. Naive, I guess. I remember the first time something I said on an information service SIG that shall remain nameless was deleted, not because it used a bad word, or was a personal attack, but because the sysop there decided he didn't like what I said. And so decided that I would not be allowed to say it. I was angry, and let him know it. I had very little motivation to leave any further messages there, as you might imagine.

Avoid ***download of programs with names like BoomWrite, WipeOut, and CrashCalc.***

A few weeks later I got wind of a flap going on in the same location, and when I went over for a look, learned from a voluminous thread that the very same sysop had recently edited the comments of another member so that his message was a very different one from the one originally left. To the small credit of the sysop, he publicly apologized to the writer and promised he would not edit member messages in the future—just delete them entirely, I'm sure.

On a competing and also nameless information service, there has been ongoing censorship for some time, based on central policy. This service demands, among other things, that no mention ever be made of competing services. As a result, any message that makes mention of something available elsewhere is summarily deleted. One SIG there gained a bit of notoriety for taking things a step farther—they deleted a monthly newsletter that made mention of a subject that SIG powers did not want publicized.

There was a time in the not so distant past when I canonized the ideals of communication via modem and lionized the role of the sysop. Gone, I would say, are barriers of race, creed, age, sex, class, and location. Let's get online and share all our ideas, without guile or prejudice. Well I know better now. There are jerks everywhere, folks. And though some jerks own modems, what is more unfortunate is that some of those jerks are now sysops themselves.

Beware of Geeks . . .

But even the problem of online censorship is dwarfed today by a brand new problem. This our old friend Mr. Peabody might call the Tale of the Telecommunicating Trojans, or Beware of Geeks Bearing Gifts.

Remember the story of the Trojan Horse? Nasty little gift it was. Did a lot of damage. Well sorry to say it, but the Trojan Horse is alive and well, and may soon be whinnying at a bulletin board near you. And unless you're careful, you might find yourself scraping manure off your hard disk.

We must once again remind ourselves that bulletin boards, networks, and online services are public places, and because they are, from time to time some rather disturbed people turn up there. Until recently this has been manifested rather harmlessly, with electronic graffitti. Once in a while more capable madmen, who have on occasion succeeded in crashing their hosts, have surfaced.

But what began as a worry for sysops alone is now a worry for you, the end user. The culprit is a category of code known as Trojan Horse programs, and they are notorious indeed.

Let's say you've logged onto a local bulletin board. There you find a new program, desk accessory, or game, which you download to your hard disk. It may sit there, benign as can be, for weeks, months, even years. It may even perform an otherwise very useful function. But sooner or later, it will explode into malevolent action. It will trash your volume directory—maybe even reformat your hard disk. Unless you have been meticulous about backing things up, you could be seriously burned.

And why, you may ask, would anyone create such a thing? Well, all I can tell you is that there are some really sick people out there, and a subset of them are so sick they are willing to invest inordinate amounts of time in hopes of making other people sick. Yes, very twisted. But extremely unfortunately, some of these programs do their jobs extremely well. I heard of one, for example, that waits, utterly patiently, until the user's hard disk is over 75 percent full. Then it destroys all data on the disk.

What can you do to avoid Trojan Horse programs? First off, back everything up. Secondly, use services that regularly check the software they offer. Third, avoid download of programs with names like BoomWrite, WipeOut, and CrashCalc. If a program looks fishy, keep it on floppy until you get a chance to have a good look at it with your tools.

And stay alert, modemers. The dream is over. It's a tough world out there. You've got to watch your back. ■

Wrong Number

The chart that appeared in the Summer 1987 edition of Teletalk listed an incorrect telephone number for the Atari Corp. of Canada BBS. The correct number is (416) 479-2169.

Tap Dance

Who says you can't dance like Fred Astaire?

I've always liked to watch soft-shoe and tap dancing. But since I have two left feet, I've never been able to participate. Until now.

Recently, the urge to cut a rug got the better of me, and I decided that mind-over-matter was the only solution. Exercising the prerogative of the uncoordinated-but-intelligent, I threw together this little program on my 8-bit system that lets me—and now you too, lucky devil!—shake a leg without ever leaving my chair. Just put a record on the gramophone, and grab that joystick.

Using Tap Dance

Type in the program as shown, and save it on disk or cassette. Plug a joystick into port 1, and type RUN. When the dancing shoes appear, you can make them tap and shuffle according to Figure 1. Turn up your TV or monitor speaker to hear, as well as see, the tapping. ■

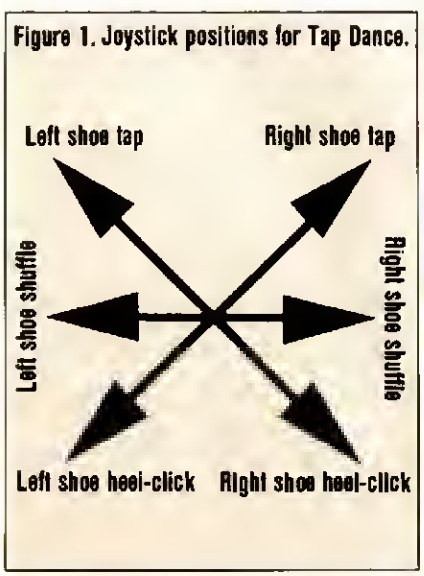


Figure 1. Joystick positions for Tap Dance.

By JOHN JAINSCHIGG

TAP DANCE

ATARI KEY

- Any Atari 8-bit computer with 48K RAM
- Atari Basic
- Joystick (port 1)

```
10 POKE 106,PEEK(106)-8:GRAPHICS 0:POKE 752,1:PRINT
20 SETCOLOR 1,0,0:SETCOLOR 2,0,10
30 PMB=PEEK(106)*256
40 POKE 54279,PMB/256:POKE 53277,3:POKE 559,46:POKE 62
3,1
50 FOR I=0 TO 3:POKE 53256+I,3:POKE 704+I,0:NEXT I
60 FOR I=512 TO 896 STEP 128
70 FOR J=50 TO 64
80 READ A:POKE PMB+I+J,A:NEXT J:NEXT I
90 POSITION 13,0:PRINT "**TAP DANCE**"
100 POKE 53248,90:POKE 53250,130
110 J=STICK(1):IF J>=13 THEN 110
120 P=(J<9)
130 GOSUB 1000+1000*(J=11 OR J=7)+2000*(J=9 OR J=5):GO
TO 110
1000 REM SHUFFLE
1010 POKE 53248+2*(P=1),85+50*(P=1)
1020 SOUND 0,30,8,10:FOR O=1 TO 10:NEXT O
1030 POKE 53248+2*(P=1),90+40*(P=1)
1040 SOUND 0,0,0,0:RETURN
2000 REM HEEL-CLICK
2010 POKE 53248+2*(P=1),0:POKE 53249+2*(P=1),85+50*(P=
1)
2020 SOUND 0,100,8,10:SOUND 0,0,0,0:FOR O=1 TO 20:NEXT
 O
2030 POKE 53249+2*(P=1),0:POKE 53248+2*(P=1),90+40*(P=
1)
2040 RETURN
3000 REM TAP
3010 POKE 53248+2*(P=1),0:POKE 53249+2*(P=1),85+50*(P=
1)
3020 SOUND 0,10,8,15
3030 POKE 53249+2*(P=1),0:POKE 53248+2*(P=1),90+40*(P=
1)
3040 SOUND 0,0,0,0:FOR D=1 TO 20:NEXT O:RETURN
4000 DATA 3,3,3,7,11,23,31,63,127,255,255,255,247,0,23
1
4010 DATA 3,3,3,7,11,55,111,255,63,223,224,127,31,7,3
4020 DATA 192,192,192,224,208,232,248,252,254,255,255,
255,239,0,231
4030 DATA 192,192,192,224,208,236,246,255,252,251,7,25
4,248,224,192
```

Software Survey

These short reviews will keep you up to date on some of the latest, greatest, and not-so-great software available for Atari computers.

Chessmaster 2000

It's hard to imagine a more complete chess program package than *Chessmaster 2000*. There are so many ways to use the program at so many different levels, that we only have space to scratch the surface here.

What many chess aficionados want to know is: How good is the computer as an opponent? Well it can be as inconsistent as the greenest newcomer or good enough to earn a 2018 rating by the United States Chess Federation.

Sargon III, with a rating of 1850 was formerly considered the best chess program, but *Chessmaster 2000* beat *Sargon III* last year, and replays of two of those contests are among the 100 example games saved on disk.

But the program deserves applause in several other areas, as well, the most impressive of which are the available options. There is a speech synthesizer, which makes it feel more like playing against a human rather than a machine. But you can turn the speech off so that a bell rather than a voice alerts you to an illegal move. The graphics are outstanding in 3-D, but a two-dimensional option is also available.

You can save a game, load a saved game, erase a saved game, save the level setting for next time, take back a move, get advice, change sides (at any point in the game), set up problems, solve problems, get analysis (of the game, not your psyche), and print moves.

Because you can enter moves with algebraic notation and because you can set up the game for two players, you can also take a description of any chess game and have it replayed on the screen.

For most games, however, you will want to use the mouse to move the pieces. The mouse moves an on-screen hand to the piece you want to move; then holding the button allows that piece to be moved across the board.

A good word or two is also in order for the manual, which not only covers a history of chess and a brief description of the 100 saved games but offers a primer on the game so that the novice player won't feel left out.

I haven't yet mentioned the 71,000 opening positions included on the *Chessmaster 2000* disk or the 13 different skill levels or even the three different styles of play of which the computer is capable. But some things you'll just have to discover for yourself. One of those things is that *Chessmaster 2000* is one of the finest programs of any kind currently available for the Atari computers.—***Rick Teverbaugh***

PLAYABILITY

CHALLENGE

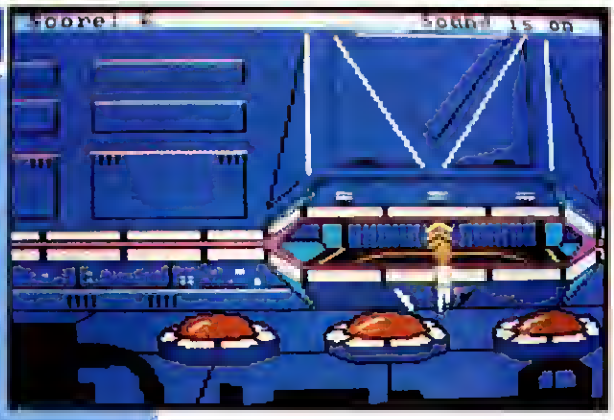
ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari 800, XL, XE; ST
Price: $39.95; $44.95(ST)
Summary: Chess simulator, opponent, tutorial and problem-solver.
Manufacturer:
The Software Toolworks
13557 Ventura Blvd.
Sherman Oaks, CA
91423
(818) 907-6789
Distributor:
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171
(800) 245-4525
(800) 562-1112 in CA

Space Quest



PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST **Price:** $49.95
Summary: A flashy graphic adventure in space.
Manufacturer:
Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
(800) 344-7448

Janitor on a spaceship—a pretty dismal job. Imagine, if you will, how your world would change if your compatriots were vaporized and you were left alone to defend yourself against hordes of hostile aliens. That's the premise on which *Space Quest* is based.

You play the part of Roger Wilco, the lone survivor of an attack on the Arcada, the spaceship on which you live. Your task is to retrieve the Star Generator, a device that can be used for enormous good or ill, and destroy it before your Sarien enemies can use it to unleash destruction on the universe.

Space Quest is set up like an arcade game; you move your character around on the screen using the keyboard, mouse, or joystick. You also use the keyboard to enter such commands as "look," "get," and "search," which you will need if you are to succeed in your mission.

By far the best feature of the game is the humor that permeates the entire adventure. Somehow, the inevitable frustration of an adventure is much easier to take when it is tempered with laughter.

The only problem I have with the program is semantic. In light of such recent developments as the StereoTek 3-D glasses, I think it is a little misleading for Sierra to call *Space Quest* a "3-D adventure." Your character is overlaid on the background, but does not appear in true 3-D; "interactive" is a better term, I think.

Space Quest is a thoroughly pleasing piece of intermediate-level adventure software. The puzzles are tough enough to be challenging but not so hard as to discourage the beginner. And if you get really stuck, Sierra will sell you an "invisible ink" hint book for $7.95.

—***Andy Eddy***

Mean 18

PLAYABILITY

CHALLENGE

ADDICTIVENESS

GRAPHICS

EASE OF LEARNING

System: Atari ST
Price: $44.95
Summary: Simulation of real golf
Manufacturer:
Accolade
20813 Stevens Creek Blvd., Ste. 102
Cupertino, CA 95014
(408) 446-5757

Mean 18 isn't a perfect golf game, but I think it is the finest golf game on the market and a perfectly wonderful way to enjoy the pleasures of the sport without leaving home.

There is so much very positive to say about the program that I will take the easy route first and cite the two things the game lacks. The first is wind. Even as an option, a feature that would force you to consider the effects of the direction and speed of the wind would add another skill element—judgment—to the game.

Mean 18 also lacks differences in elevation; the entire course is played on a flat layout, except for the greens where contour does play a vital role.

Otherwise, *Mean 18* is as near perfect as any software program to cross this jaded reviewer's screen in three or four years.

Included in the package are four courses. The easiest is Bush Hill Country Club, a mythical layout designed to be challenging but not overwhelming for the newcomer. After you have sharpened your skills on that course, you can try the three others that come on a separate disk—St. Andrews, Pebble Beach, and Augusta.

The mouse is used to make all game selections, including club and direction of the shot. A click of the mouse button begins the swing. A second tap controls the strength of the shot, and a third the line of shot, whether a hook or slice will be the result. In the beginning it is a good idea to try to hit the ball straight each time, but as your skills improve, you will find many ways to make hooks and slices work to your advantage.

All the traditional hazards of the links are included: sand traps, light and deep rough, water, and trees. When you get on the green, you will have some tricky breaks with which to contend. Unlike some programs, in which the entire green slopes to the same degree and in the same direction, *Mean 18* offers the golfer the ability to play more than one break in more than one direction on

long putts.

During play, the perspective on the screen is from right behind the golfer. That changes only when on the green, when the view shifts to an overhead to make viewing the breaks easier.

In general, the action of the golfer and the ball is realistic. If the ball enters the sand on the fly or the bounce, it will probably remain there. It bounces a little in light rough and very little in the deeper stuff. Hitting around or under trees takes some practice, and you will soon learn why going for the flag on the green isn't always the best strategy.

All of these qualities would certainly be sufficient to make *Mean 18* a much better than average program, but there is one more feature that places it on a pinnacle reached by few programs of its kind. I am talking about the Course Architect, a utility you can use to create as many different courses as your imagination will allow.

For those who would rather play than design, Accolade offers an additional course set that includes the Inverness, Turnberry, and Harbour Town courses.

With only a few minor exceptions, *Mean 18* is just about everything you could ever want in a golf program—except maybe the 19th hole.

—Rick Teverbaugh

World Championship Karate

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari 8-bit and ST, joystick

Price: $29.95; $39.95 (ST)

Summary: High-tech martial arts combat simulation; one of the best.

Manufacturer:
Epyx
600 Galveston Dr.
Redwood City,
CA 95063
(415) 366-0606

People sometimes ask why a white-collar guy like me has such thorny-looking calluses on his hands. Truth is that up until about a year ago, when I was sidelined by a maltreated tennis injury (the humiliation!), it was my habit, six times each week, to do push-ups on my knuckles while counting aloud in Japanese—the monotony occasionally broken by bouts of meditation, academic violence, and obligatory bows to my teacher and to a photograph of my teacher's teacher, now deceased.

Since my injury, I've been looking around for a really good Karate simulation, hoping to keep my joystick reflexes in trim until such time as I can return to wiping down the training floor with Pine-Sol. Epyx has finally obliged by releasing *World Championship Karate* for the Atari ST, an exceptionally good simulation of basic hard-style combat cast against a sequence of glamorous backdrops from Sydney Opera House to the Moulin Rouge.

Lest real Karatekas too swiftly abhor the notion that Karate and glamour have anything in common, I hasten to add that *World Championship Karate* offers pain, tedium, and humiliation as well.

The program is supplied on two single-sided disks, and the boot sequence involves firing the program up from Disk 1, then placing Disk 2 in the drive when prompted to do so. Unfortunately, if you so much as touch the keyboard before being prompted to insert the second disk, the program crashes.

Epyx confirms the presence of this bug, and will include a "kata for avoidance" in subsequent releases of the software.

Once the program has loaded, there's the user interface to contend with. Each of 16 possible states of the joystick (eight basic directions combined with button press) translates to an attack or movement. Moreover, the control template flips mirror-fashion, depending on whether your figure is facing left or right.

The manual suggests getting the hang of the controls by doing a little kata in the two-player mode (while letting the other joystick hang loose, naturally), and I found the controls quite manageable after a little practice.

When one is finally ready to fight, the action is nothing short of spectacular. The two figures move, leap, strike, and block with the same terrifying speed that one encounters in real freestyle combat, and the results of this violence—right down to the eloquent look of surprise on a man's face as he crumples to the mat—are depicted with awesome attention to detail. Add sound effects out of a Chuck Norris movie, a plethora of humorous, animated backgrounds (I particularly like the camels that walk along the horizon in the Egypt scene, and the neon Can-Can girls in Paris; though you may prefer the Tokyo-Osaka express or the Venetian gondolas or . . . or . . .), a white-bearded referee who talks in cartoon dialogue balloons, and a bouncy score and you have a game that fails to become addictive only because it is so compelling to the concentration.

There must be a super-duper "win screen" somewhere in the program, but I haven't seen it, and I've been playing on and off for days. Still, the essence of Bushido is patience and tenacity, and until this ankle heals and I can get back to the serious business of bowing to my teacher's teacher and counting in Japanese, my ST and I will be following the way of the warrior here at home.

—John Jainschigg

Phantasie II

PLAYABILITY

ADDICTIVENESS

CHALLENGE

EASE OF LEARNING

GRAPHICS

System: Atari ST
Price: $39.95
Summary: Graphic adventure game
Manufacturer: Strategic Simulations
1046 N. Rengstorff Av.
Mountain View, CA
94043
(415) 964-1353

It is easy to get carried away with superlatives when reviewing game software, because each new generation of games holds more challenge and looks better than the one before. For example, I recently lavished great praise upon SSI's *Phantasie* as one of the top 20 games on the market for the ST. Now I am forced to tell you that if *Phantasie* is still in the top 20, then *Phantasie II* must be among the top 10.

Perhaps the best feature of *Phantasie II*, especially for those who have spent hours or even days on the isle of Gelnor in the original game, is that the characters created for *Phantasie* can be easily and completely transferred to the sequel.

The new quest takes place on another island, called Ferronrah, which is just south of Gelnor. The evil Dark Lord Nickademus has been busy here also. He has fashioned an orb that has put a curse on the island and enslaved its people. It is your task to locate the orb and destroy it.

In many ways, the sequel is more difficult than the original. You needn't own the first edition to play the second, but it helps. The stronger, higher class characters it took to succeed on Gelnor will find it much easier to get things done on Ferronrah than new characters, who will have to tread lightly and think quickly to reach upper level status.

For those not familiar with the game system at all, *Phantasie II* is an adventure with spectacular graphics. The adventure begins as you create a band of travelers out for fame, glory, and gold. Each member can be one of several races—humans, dwarves, elves, gnomes, halflings, gnolls, goblins, kobolds, lizard men, minotaurs, ogres, orcs, pixies, sprites, or trolls. All races fall into one or more of the six classes—fighters, monks, priests, rangers, thieves, and wizards. Since you can have six adventurers in a party, it isn't a bad idea, at least in the beginning, to choose one from each class.

Each character is given a rating from 3 to 22 in strength, intelligence, dexterity, constitution, and charisma. These qualities, or lack of them, affect how well he can perform certain deeds within the game.

Each adventure begins and ends in a town. In those towns, you visit the Guild to create, add to or subtract from the party, deposit or withdraw money from the bank, and buy weapons, armor, potions and supplies.

It is important to build your characters up, because spells gain in strength and versatility and magic powers increase as the level of the character increases. For instance, at the opening level, a wizard is armed with two spells, Fireflash 1 and Quickness 1. The first shoots a ball of fire at the nearest monster in battle, and the second makes everyone in the party 10% quicker so that they can get in more hits in a fight.

As that same wizard reaches level two of experience he gains two new spells, Strength 1 and Charm. The first gives each adventurer the ability to take one or two extra hit points of damage before dying, and the second makes monsters nearly forget that they're supposed to be trying to kill you.

But there is too much to *Phantasie II* to be covered completely in a few paragraphs; it takes a 27-page manual to do that job, which brings me to my only complaint about *Phantasie II*.

The rule book explains in great detail the game system common to both versions and the story line of each. Then the remaining ten pages are devoted to rules specific to each computer for which the game is available. For $39.95, I expect a manual written for my computer.

In addition, the one-page summary at the back of the manual that explains changes and additions made for *Phantasie II* is totally inadequate. I'm confident that you will be able to figure it out, but I'm not convinced that you should have to work so hard to compensate for a poorly planned manual.

—***Rick Teverbaugh***

HELP KEY (ST)

Wish you could start an application by double clicking on a datafile? Easy. Let's say you always boot *ST-Writer*, then open files from there. Try this instead: On the desktop, click once on the application program icon (in this case ST-Writer), so that it darkens. Now go to the Options menu and click on Install Application. In the field called Document Type, enter the three-character extender for the file type associated with the application. In this case, it might be .DOC, but you can do the same with *Degas* files(.PI1, .PI2, or .PI3), or any other application datafiles with like extenders. Next save the desktop to make this a permanent capability.

You can now double click on any document file and open automatically to that file under the application it calls—just like that fruity computer with the tiny black and white screen. Note: The application and the datafiles must reside on the same disk for this to work. ■

Championship Wrestling

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System and Price: Atari ST; $29.95
Summary: Arcade-style game of championship wrestling
Manufacturer:
Epyx
600 Galveston Dr.
Redwood City, CA
94063
(415) 366-0606

There just has to be a better way than this to simulate the grunts and groans of the championship wrestling that has pounded its way onto our TV screens with increased frequency since Hulk Hogan's famous appearance in "Rocky II."

Most people who watch wrestling—either on TV or in person—say they enjoy the sport not for its realism but for its entertainment value; they find it fun to watch. It should follow, then, that to capture the true flavor and spirit of the sport, a game should be a lot of fun to play. *Championship Wrestling* isn't; the programmers had some very good ideas, but they seem to have run out of ways to implement them.

The only way to learn the game well is to start at ground level with another beginner and play head-to-head matches. Trying to defeat the computer-controlled monsters of the mat is not only an exercise in futility, it is enough to make you put the game on the shelf—forever.

Before going into the reasons why the game shouldn't be so easily dismissed, let's discuss its problems. In addition to just walking around the ring and bouncing off the ropes it is possible to do the following to your opponent: flying drop kick, punch, kick, headlock, atomic drop, body suplex, suplex, lift, pile driver, body slam, airplane spin, and throw.

You can use the drop kick, punch, or kick or get your foe into a headlock right off the bat. But to do anything else requires at least one intermediate step. To execute an atomic drop, suplex, or lift, for example, you must get a headlock first. For a pile driver, body slam, or airplane spin, you must get a headlock and then a lift. To throw an opponent, you must first get a headlock, then execute a lift, and finally do an airplane spin.

To play this game successfully you must either have a photographic memory or constantly refer to the manual. If you play against the computer, just one glance away from the screen can mean instant defeat.

All these moves are accomplished through joystick manipulation, so you must memorize which hold must be preceded by which other moves *and* which joystick movement produces that hold.

On the positive side, the graphics are quite good. The animation is smooth, and some of the spirit of the sport is maintained through the personalities of the computer grapplers and through the audience participation. You see the crowd get really involved in a closely contested match, but if you climb the turnbuckle and miss the foe when you jump off, the crowd will get real ugly.

A running score is kept throughout the match, and if time expires the winner is the matman with the highest point total. A practice mode allows you to perfect your moves, and competition mode allows you to square off against seven wrestlers in succession if you are the only one playing. With more than one player, each gets a different wrestler, and a tournament is drawn up leading to a championship match. Up to eight players can participate.

The included grapplers (from easiest to defeat to hardest) are Howling Manslayer, The Berserker, Zeke Weasel, Zantoklaw, Prince Vicious, Colonel Rooski, Purple Hays, and K.C. Colossus. The ring perspective is just above the top rope and toward one corner.

Championship Wrestling can be an enjoyable diversion, especially for wrestling fans who can find other fans to act as opponents.—***Rick Teverbaugh***

HELP KEY (8-Bit)

Have two files on disk with the same filename? This can be a nasty problem, but there is a way out of it:

- Copy the loadable (first) file to another disk es e backup.
- From Basic, type POKE 3118,0 [RETURN]
- Go to DOS and rename the file—only the first one will be renamed.
- Go back to Basic and type POKE 3118,184[RETURN]

You should now be able to access both disk files on your original disk. ■

Need a random number between 0 and 255? Sneak a PEEK at memory location 53770. ■

Want to create a MEMSAVE file from Basic? All you need to do is type:

A=USR(5947)[RETURN].

Owners of XL series computers will need to hit RESET after the disk stops spinning. ■

Want to disable the BREAK key in your own programs? Insert the following after every GRAPHICS, PRINT, and OPEN command:

POKE 16,64:POKE 53774,112

Remember, once is not enough with this one. You must disable the BREAK key after each use of the commands listed ebove. ■

Age of Adventure

PLAYABILITY

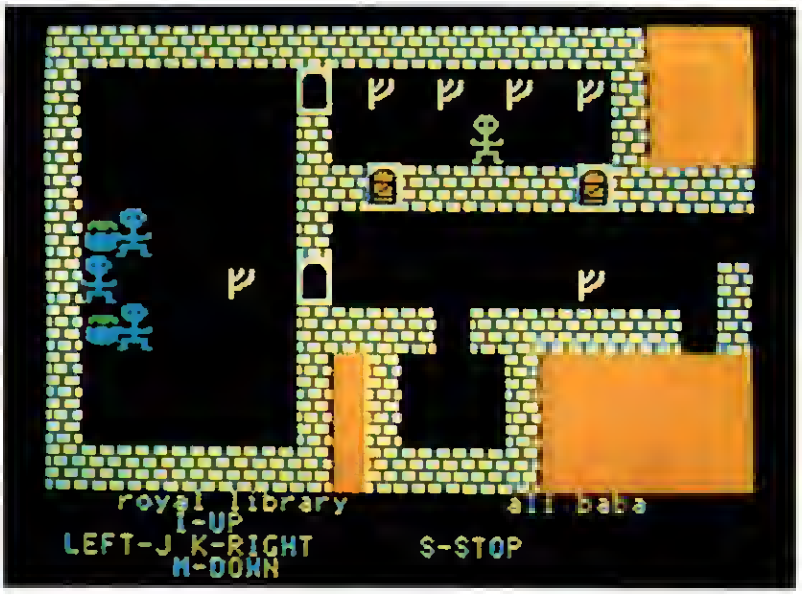
CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: 48K Atari 400/800, XL, XE
Price: $14.95
Summary: Bundled pair of classic role-playing adventures.
Manufacturer:
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171
(800) 245-4525
(800) 562-1112 in CA



A new trend in Atari 8-bit software marketing calls for publishers to bundle two or three of their older titles in a single package and release it at a bargain price. This approach makes a great deal of sense, both for the publisher, who can squeeze additional sales from an aging title, and for new computer owners, who probably never saw the original releases and now have an opportunity to build a collection of high quality software for relatively little money.

Following this trend, Electronic Arts released *Ali Baba and the Forty Thieves* and *Return to Heracles* on a single disk (one game per side) and called it *Age of Adventure*.

Stuart Smith's original games are still fresh and challenging, and the two-for-less-than-the-price-of-one marketing ploy makes the package an extraordinary value.

The two graphic role-playing adven-

The folks at Shelbourne Software have a unique theory about the function of the mouse in a game format. While most games use the mouse buttons to select choices and to set things in motion, Shelbourne products rely on the actual motion of the mouse to accomplish the same purposes.

That idea worked with only marginal success in their *ST Pool*, because players had a hard time substituting the chubby, pocket-sized mouse for the long, slender cue stick. But the idea really takes off with *ST Shuffleboard*.

The weights used in table shuffleboard—not the kind they have on cruise ships, but the kind you see in bars and game rooms—are very similar in size to the mouse. So when you slide the mouse across the table top, you get a really good feel for the action of the game.

You depress the mouse button to pick up the weight and move it around. To shoot, you release the button while moving the mouse forward. The weight then moves down the table at the velocity at

ST Shuffleboard

PLAYABILITY

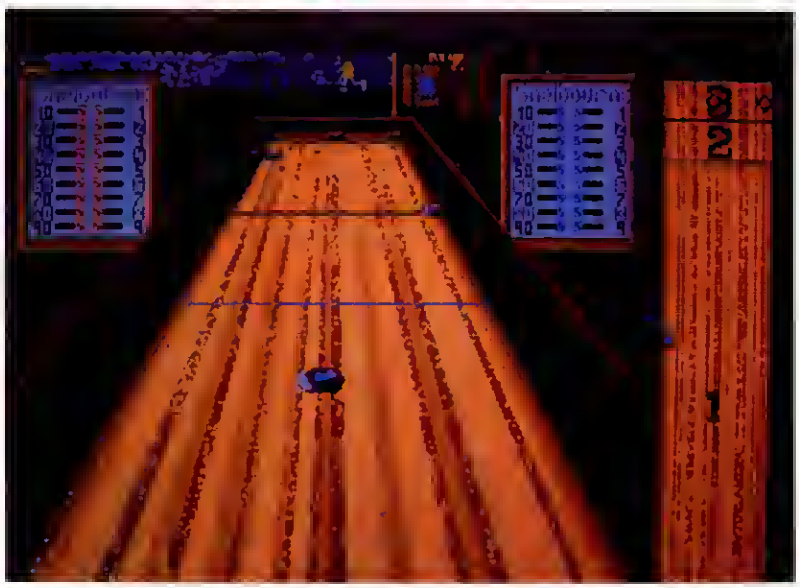
CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST
Price: $29.95
Summary: Simulation of table shuffleboard
Manufacturer:
Shelbourne Software
P.O. Box 17
Wyncote, PA 19095
(215)884-2656



tures are similar in layout but different in content. *Ali Baba* takes you to the Middle East in search of a sultan's daughter, Princess Buddir al-Buddoor, who has been kidnapped by traitors.

As the sultan's messenger, you have little hope of mustering any significant military support, so you set out on your own with a band of recruits to help you slay the strange creatures and enemy warriors you meet along the way.

Return to Heracles is set in mythical Greece and features such creatures as Pegasus, Medusa, Hydra, and Prometheus. The goal of this game is less well-defined: you must travel to the Oracle of Zeus to be assigned one of 12 missions. You can play your task out with a band of helpers or go it alone.

Additional polish and enhancements in *Heracles*—primarily in animation and graphics—bespeak its later release, but *Ali Baba* holds up well in the comparison. Also, both of these gems are randomized to a certain extent, so every game is different.

Age of Adventure is an unusually good buy at $14.95 and a "must have" for 8-bit adventurers who missed its components on the first go 'round.

—***Andy Eddy***

which the mouse was moving when the button was released.

It will probably take several games before you get the hang of stopping the weight close to the end of the table without letting it fall off the edge. The score is determined by the location of the weights after each player has shot all four. The game offers five different methods of scoring.

The program has all sorts of options to make it easier to use. You can, for example, alter the relationship between mouse movement and weight movement. The quality of the computer foe can also be adjusted to be a better match for its human counterpart.

On a real shuffleboard table, cornstarch is used to make the weights slide; you can adjust the program to make the simulated table more or less slick than the standard setup. It will take quite a bit of experimentation to find the best setting, because the manual is of little help, and the illustrations aren't well done at all.

Fans of table shuffleboard will probably fall madly in love with this program and for good reason. But as a game in its own right, *ST Shuffleboard* isn't well enough executed to bring many converts to the game.—***Rick Teverbaugh***

10th Frame

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST
Price: $39.95
Summary: Realistic bowling simulation
Manufacturer:
Access Software
#A 2561 S 1560 W
Woods Cross, UT 84087
(801) 298-9077
(800) 824-2549

Given that real world keglers outnumber real world golfers by a significant margin, it is surprising to me that it has taken the entertainment software industry this long to produce a bowling simulation.

Whatever the reason for the wait, it has been time well spent because *10th Frame* has nearly everything a bowler could want.

There are three levels of competition. The first is strictly for kids. The ball always travels in a straight line, and all you have to do is place the bowler on the lane, aim the shot, and let it go.

At the amateur setting, the curve and strength of the shot come into play but are fairly easy to control. At the professional level, however, getting the ball to roll at the speed desired and with the right amount of hook is a more exact science.

Controls for the game are similar to those of the Access *Leader Board* golf game, so if you have played that game, you will have less difficulty getting started with *10th Frame* than those who are new to Access software.

All commands are entered with the mouse. You move the pointer to the bowler and click on the figure to position him along the lane. The same procedure moves the aiming arrow out on the lane.

When you are satisfied with both settings, clicking the mouse button starts the bowler moving toward the pins. As he moves, a bar on the right-hand side of the screen begins to climb toward the top of the screen, indicating a steady increase in the amount of strength with which the ball will be rolled. Releasing the mouse button sets the strength. Then the bar starts down the other side of the graph. Hitting the button again early in this path causes the shot to be straight. The longer the bar travels, the sharper is the hook.

The program allows for "open" and league bowling as well as individual games. In league play, you enter the team name, the number of players on each team (maximum of four), and the number of games to be played (maximum of three). In open bowling, up to eight can play up to five games each.

The graphics of *10th Frame* are very life-like and smooth in animation. Pin action, among the most difficult things to simulate in sports, is believable. Hitting too heavily on the head pin, for example, almost always results in a split.

Making spares is a key ingredient in high scores, and the crowd participates, giving applause for strikes and spares.

The game is good, but it could be improved. One way would be to give the bowler a choice of ball weight and whether he prefers a southpaw or righty delivery. Differences in the slickness of the alley would also add some variety to the game.

All things considered, however *10th Frame* should please most bowlers—whether they are avid league players or just occasional visitors to the lanes.

—***Rick Teverbaugh***

Arcticfox

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST
Price: $39.95
Summary: Arcade tank battle—one of the best
Manufacturer:
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171
(800) 245-4525
(800) 562-1112 in CA

If you haven't yet added a tank-type battle game to your collection, buy *Arcticfox*. If you think you've seen everything there is to see in tank battles, buy *Arcticfox*. If you thought you'd never have a desire for a tank battle game you guessed it—buy *Arcticfox*.

I hope I've made my feelings about this game perfectly plain, but just in case I've failed, let me add: from the out-the-window perspective, there is no better inside-a-tank challenge than this entry.

But this is no ordinary tank. This is the Slye-Hicks MX-100—code name, Articfox. The scene is Antarctica, where the aliens have been plotting a takeover for some time. The only barrier that remains to the takeover is the need to change the oxygen-based atmosphere to one of ammonia, methane, and chlorine. Obviously, if they get the job done, not even people who grew up in Los Angeles will be able to survive.

The aliens have set up oxygen converters to change the air. When that conversion is finished, so are you, even if the tank is still in perfect working order. That means the converters should be your first target; if you put them out of commission, you will have more time to destroy the communications fort and the main fort.

The alien arsenal includes a heavy tank (used for the main offense), light tanks (quicker but easier to hit), recon sleds (used to detect the Arcticfox and relay its position), rocket launchers (ultimate defensive weapon but can be destroyed from the rear), fighters (fast and deadly), and floating mines (will track Arcticfox slowly upon visual contact).

Also part of the aliens' battleground are radar stations, which relay the position of your tank to all weapons in the area, and communications and main forts.

But Arcticfox has plenty of firepower of its own. The instrument panel is impressive but confusing. Above the main viewing screen is the warning light, which tells when Arcticfox has been spotted. There is a clock, which starts at 0900 for each mission, and below the main viewing screen is a smaller screen that shows, alternately, the radar screen or the aft view.

On the right-hand side of the panel

King's Quest III

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST
Price: $49.95
Summary: High quality graphic adventure
Manufacturer:
Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
(800) 344-7448

You'll notice, if you glance at the overall ratings for the third in the King's Quest series, that there is nothing much wrong with the game or the system upon which it is based.

Owners of *King's Quest I* and *II* will probably buy *III* (*To Heir Is Human*) for the same reasons that "Nightmare on Elm Street 3" and "Friday The 13th Part VI" were popular films—it is very easy to get involved with a familiar scenario and a well-known character.

Nor is there any need to learn a new game system. Everything works about the same as it did in the previous two versions. In fact the system is probably too similar. It might be all right for techniques used in books and films in a series to stand still, because those two industries are still doing things in about the same manner as they were five or ten years ago.

But things move so fast in the computer industry that the classic games of a few years ago don't stack up well against even the mediocre offerings of today.

Thus, it is a shame that such a fine game series has undergone so little innovation. When *King's Quest I* was released it stood at the top of the pack of action adventures and had very few challengers. By the time *II* (*Romancing The Throne*) appeared, competitors

you get a readout on the amount of oxygen remaining, a compass, and a damage bar, which moves left to right as the tank suffers hits. On the left-hand side is an indicator of the number of mines remaining.

Control of the tank can be by mouse, joystick, or keyboard. Joystick is the best choice. Hitting the Q or 7 key changes the joystick control from the chore of moving the tank, to the job of changing the inclination of the cannon sights.

This brings up my sole complaint with the game. Because that change can't be accomplished by pushing the joystick button or moving the stick and because it is often necessary to make the switch several times quite quickly in the heat of battle, until you train your fingers to find Q or 7 without much direction from your brain, you may experience some frustration.

One final remarkable feature of the tank is its ability to dig into the snow and escape detection. Guided missiles can still be fired when in this position, but it is difficult to hit a target because the viewport is covered with snow.

There aren't many games to which I would give high ratings in all areas of execution, ease of use, and enjoyability. *Arcticfox*, however, easily earns a spot at the top of my list of favorite computer games.—***Rick Teverbaugh***

Trinity

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

System: Atari ST
Price: $39.95
Summary: Compelling pre-World War II text adventure.
Manufacturer:
Infocom
125 CambridgePark Dr.
Cambridge, MA 02140
(617) 492-6000
(800) 262-6868

Trinity was the code name used by the Manhattan Project engineers for the original atomic bomb test that took place during World War II and led to the bombing of Hiroshima and Nagasaki in 1945. Given the opportunity to be there, would you have tried to intervene?

Infocom's *Trinity* gets its title from that nuclear test, but the story starts in the present day with your character on holiday in London. Just by chance, you discover that World War III is about to begin, and you have to high-tail it out of there to escape annihilation. Getting far enough away from a nuclear blast to survive is difficult, but Infocom always manages to give you an out. As fiction, the game has plenty of room for fantasy in your escape and subsequent adventure.

Infocom's interactive fiction is successful not only because of its consistent quality, but because of the "support materials" that come with each game—props you can use in solving the puzzles that are interwoven throughout each game.

For example, the informative comic book that comes with *Trinity* gives a brief history of the events leading up to the current situation, helping you to understand the scenario in which you find yourself.

As with all Infocom games, the best feature of *Trinity* is the vivid imagery that your mind builds from the descriptions of your surroundings. You find yourself believing that this *Alice in Wonderland*-like world exists and that you really do play a vital role in the outcome of history.

Trinity is a serious challenge. It involves you totally and forces you to stretch your imagination to the limit. I recommend it.—***Andy Eddy***

were gaining on it, but remained a safe distance behind.

Even the folks at Sierra seem less interested in *III* than in *II*. While the scenario for *II* occupied eight pages in the documentation, four were sufficient for *III*. And in those four pages, we find no mention of exactly what the adventurer is supposed to do; there is no goal. To discover the ultimate goal is part of the challenge in *III*.

For those not familiar with *I* and *II*, I should explain that the on-screen character is moved by joystick, mouse, or keyboard. Commands must be typed to communicate with other characters in the game, so you might as well use the keyboard for movement also.

King's Quest III is a game for the patient. It offers a save game option, which I recommend that you use often, because your character can die suddenly, with little warning. Each area must be explored carefully and, in some cases, visited more than once.

Maps are an absolute necessity if you hope to avoid getting lost. You can carry a nearly unlimited inventory, so it makes sense to pick up almost everything you come across. And don't be afraid to use the things you're carrying in strange and unorthodox ways; nobody will laugh at you, and you might make some unexpected progress.

About the only additions to *King's Quest III* are seven spells, the instructions for which are in the documentation. These spells are more likely to work if you have picked up the required ingredients along the way.

Using the spells it is possible to understand the language of birds, fish, and other animals; fly like an eagle or a fly; teleport from one place to another; cause a deep sleep; transform a character into a cat; brew up a storm; or become invisible.

In all, *King's Quest III* isn't a bad game by any means. It certainly ranks a cut above the average with graphics that are among the best and most lifelike on the market. But given its excellent beginning, I find it a bit disappointing to see the project bog down as it follows in its own footsteps a little too closely.—***Rick Teverbaugh***

Programming with GEM

In the first four articles of this series, most of the commonly-used functions of the GEM Virtual Device Interface have been discussed. In this, the fifth installment, we'll leave the VDI and begin to explore the other major component of GEM—the Application Environment Services package (AES).

The phrase "Application Environment Services" sounds pretty abstruse, but the "grand plan" behind the GEM AES is really fairly simple. AES provides a software *environment*—a system with clearly defined rules, conventions, and behavior—under which GEM applications, desk accessories, and the like, can run cooperatively.

AES provides high-level "services," including memory and window management; inter-application message passing; menu bar, icon, and resource management; alert box and file selector handling; and other conveniences to client applications. When applications use these services in the proper fashion, the AES can mediate their interactions and make the system as a whole work smoothly.

Though the AES can be thought of as a cohesive package of services, it is not by any means independent of the rest of GEM. In some cases, the AES acts as an additional level of logic between your program and lower levels of the operating system hierarchy. For example, AES works through VDI to do rubberband boxes and other graphic tricks. In other cases, AES may bypass VDI and provide alternate routes to lower-level operating system functions.

By BOB COCKROFT

AES Libraries

The functions available under AES are divided into 11 *libraries*, each of which relates to a different set of basic operations. AES functions are named starting with a four-character mnemonic indicating the library from which they are drawn. That mnemonic appears in parentheses following the library name in the following list.

Application Library (appl): These functions are used when a program first starts up and when it terminates. They bind a program to or unbind it from the application environment and set up structures used for communication between the application and the AES services it employs.

Event Library (evnt): Functions in the Event Library permit an application to watch for and interpret a wide variety of input *events*—mouse clicks, keypresses, timer ticks, etc. Event library functions are not equivalent to superficially similar, low-level VDI, BIOS, and XBIOS input functions, primarily because they interpret input in terms of the application context as a whole.

Menu Library (menu): This library provides functions for setting up and controlling pull-down menus.

Object Library (objc): This library provides functions to help maintain and display graphic *objects* such as dialog boxes.

Form Library (form): The form library offers functions that permit creation, display, and use of simple graphic objects like alert boxes and that mediate user interaction with more complex graphic objects (*forms*) like dialogs.

Graphic Library (graf): Functions in the Graphic Library do things like draw expanding and shrinking boxes, resizable rubberband outlines, and the like. One Graphic Library function, graf handle, helps establish the relationship of an appliation with the VDI.

Window Library (wind): The Window Library provides functions that assist in the creation, updating, monitoring, and disposal of GEM windows.

Resource Library (rsrc): This library offers functions that permit an application to load and access the external *resource files*, which define the appearance of dialog boxes, icons, and menus.

Scrap Library (scrp): Scrap Library functions help manage the exchange of data between applications.

File Selector Library (fsel): The single function in this library—fsel input—creates GEM standard file selector dialog boxes and monitors user interaction with them.

Shell Library (shel): Among other things, the Shell Library permits applications to invoke one another directly.

Working with AES

Now that we have looked at the overall framework of AES, we'll begin to demonstrate how portions of it are used in programming.

Certain AES functions—notably the Applications Library functions appl init( ) and appl exit( ), which initiate and terminate the relationship of an application with the GEM environment—will already be familiar to those who have worked with the programs in this series. Use of them is mandatory for all proper GEM applications.

The procedure for initializing a GEM application starts with the declaration of five of the external integer arrays (contrl, intin, ptsin, intout, and ptsout) used for passing parameters and returned values between your program and the system. Once these arrays are declared, the program should make a call to appl init( ) as follows:

```
ap id = appl init();
```

binding the application to the AES and returning an application ID in integer variable ap id. If the operation is successful, ap id will be zero or positive.

When the application is ready to terminate, a call is made to appl exit( ). This function removes the application's data structures and cleans up the application environment. The call is made as follows:

```
ap xreturn = appl exit();
```

where integer ap xreturn will take on the value zero if an error exists, a positive value otherwise.

Working with Windows

Some of the most valuable and powerful features of the AES deal with window management—designing, opening, closing, and manipulating screen windows.

The first step in displaying a window involves determining what its maximum dimensions will be. Though these dimensions may be set arbitrarily, there is a certain degree of sense in assuming that maximum window size should equal display screen size. Naturally, this changes with graphics mode.

The Window Library function wind get( ) is used to simplify the process of determining maximum window size in *resolution independent* programs:

```
wind get(0,4,&wi maxx, &wi maxy,
 &wi maxw, &wi maxh);
```

The parameter 4 in the second position tells the function to return maximum upper left-hand corner X and Y coordinates and maximum window width and height by writing them into the four integer variables pointed to by the last four parameters. (The wind get( ) function also performs a variety of other tasks, which we'll discuss in more detail in subsequent installments of this series.)

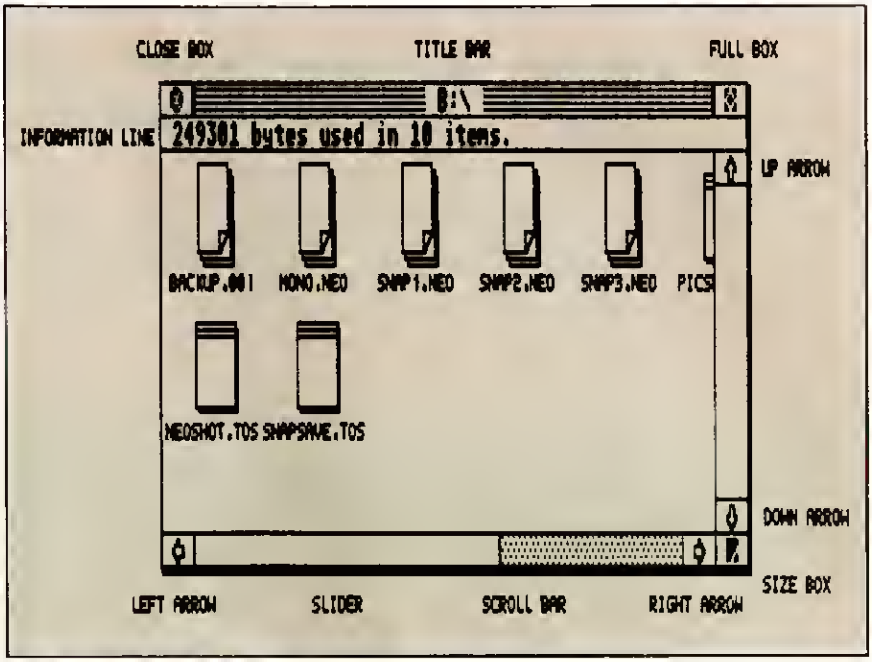


Figure 1. Window features

Once maximum dimensions have been determined, the next step in creating a window is to select its display features. Illustration 1 shows an application window that incorporates all possible features: a title bar, scroll bars, arrows, sliders, and size boxes. However, windows can be made to incorporate any combination (or none) of these features, as appropriate to the needs of a particular program.

The function wind create( ) is used to initialize a window and select its features. The call is made as follows:

```
wi handle = wind create(wi crkind, wi maxx, wi maxy,
  wi maxw, wi maxh);
```

where integer wi crkind is a 16-bit integer *bitmap* in which each bit determines whether a particular window feature is present or not.

The value can be made up by referring to Table 1. The technique is simply to sum the decimal values corresponding to each of the features you wish included to create an overall value for wi crkind. For example, to create a window that includes a title bar, a close box, a full box, and a vertical slider, you would add 1+2+4+256 for a wi crkind value of 263.

Table 1. Window features and corresponding wi crkind bit values

Bit	Decimal value	Feature
0	1	Title bar
1	2	Close box
2	4	Full box
3	8	Move box
4	16	Information line
5	32	Size box
6	64	Up-arrow
7	128	Down-arrow
8	256	Vertical slider
9	512	Left-arrow
10	1024	Right-arrow
11	2048	Horizontal slider

The wind create( ) function also requires input of the maximum size values for the window, as returned by wind get( ).

After initializing the window (not displaying it, but merely setting up internal data structures that record its features), wind create( ) returns an integer window handle in variable wi handle( ). This value is used to identify the window in subsequent operations.

Finally, the window can be displayed or "opened." This is done using the function wind open( ), as follows:

```
wi oreturn = wind open(wi handle,
 wi owx, wi owy, wi oww, wi owh);
```

where wi handle is the window handle returned by wind create( ), and wi owx, wi owy, wi oww, and wi owh are the initial upper left-hand corner X and Y coordinates and initial width and height of the window. The function returns an error code of 0 in variable wi oreturn if an error occurs, a positive integer otherwise.

A window can be removed from the screen by either closing or deleting it. When a window is closed, it is removed from the screen but remains stored in memory. It can subsequently be displayed unaltered. To close a window, supply the window handle to the wind close( ) function:

```
wind close(wi handle);
```

When a window is deleted, it is effectively erased from memory and must be re-created using wind create( ) before it can be re-opened. To delete a window, supply the window handle to the wind delete( ) function:

```
wind delete(wi handle);
```

Using the Title Bar and Information Line

The wind set( ) function is used to set many attributes of a window's appearance, including the contents of its title bar and information line. To set the contents of the title bar, use wind set as follows:

```
wind set(wi handle, 2, "Window Title");
```

WINDOW DEMO

ATARI KEY

- Any Atari ST Computer
- Mark Williams C-Language Development System

```
/* wind_set() defines */

#define WF_NAME 2
#define WF_INFO 3

/* window attribute defines, also found in header gemdefs.h */

#define NAME     0x0001
#define CLOSER   0x0002
#define FULLER   0x0004
#define MOVER    0x0008
#define INFO     0x0010
#define SIZER    0x0020
#define UPARROW  0x0040
#define DNARROW  0x0080
#define VSLIDE   0x0100
#define LFARROW  0x0200
#define RTARROW  0x0400
#define HSLIDE   0x0800

/* AES binding arrays */

int contrl[12],intin[128],ptsin[128],intout[128],ptsout[128];

/* VDI workstation arrays and workstation handle */

int work_in[12],work_out[57],handle;

main()
{
        int ev_kreturn,wi;

/* Initialize the application */

        appl_init();

/* Open a VDI workstation */

        open_vdi();
```

where the parameter 2 indicates a title bar change. To set the contents of the information line, use the parameter 3 in this position. We'll be dealing with the many other capabilities of wind set( ) in later issues.

Reading Keyboard Events

The AES returns keyboard information through the Event Library function evnt keybd. This function halts the execution of the program and waits for input:

```
ev kreturn = evnt keybd();
```

When a key is pressed, its code is returned in variable ev kreturn, and the program continues.

Window Demo

In Listing 1 is a sample program created with Mark Williams C that uses the AES features discussed thus far to create and display a full-featured application window. Enter the program into a file called winderd.e using MicroEMACS or an equivalent editor. Compile it from the Mark Williams msh shell prompt by typing:

```
$ cc windcrd.c -VGEM
```

where the parameter -VGEM serves to link in the proper startup routines and the required AES and VDI libraries. Execute the program from the shell by typing:

```
$ gem windcrd.prg
```

■

```
/* Set up an application window */

        w1 = window_gen(NAME | CLOSER | FULLER | MOVER | INFO | SIZER |
                        UPARROW | DNARROW | VSLIDE | LFARROW | RTARROW |
                        HSLIDE,"Name of Window","Press any key to continue",
                        25,25,275,140);

/* Wait for a keypress */

        ev_kreturn = evnt_keybd();

/* Close and delete the window */

        wind_close(w1);
        wind_delete(w1);

/* Close the virtual workstation */

        v_clsvwk(handle);

/* And exit the application */

        appl_exit();
}
/* Sets up a window and returns its handle */

window_gen(type,title,inf,x,y,w,h)
int type,x,y,w,h;
char *title,*inf;
{
        int w_handle;

        v_hide_c(handle);
        w_handle = wind_create(type,x,y,w,h);
        wind_open(w_handle,x,y,w,h);
        if (*title != '\0') wind_set(w_handle,WF_NAME,title);
        if (*inf != '\0') wind_set(w_handle,WF_INFO,inf);
        v_show_c(handle);
        return(w_handle);
}

open_vdi()
{
        int i,d;

        for(i=0;i<10;work_in[i++]=1); work_in[10]=2;
        handle = graf_handle(&d,&d,&d,&d);
        v_opnvwk(work_in,&handle,work_out);
        v_hide_c(handle);
}
```

A historical simulation of the famous adventurer's journey along the Silk Road

Marco Polo

THE GAME

In Marco Polo you are the leader of a group of merchants leaving on a business trip from Venice, Italy to Shang-tu, China. After sailing to Armenia at the east end of the Mediterranean Sea, you set out by camel on a 6000-mile trek across Asia to the court of the Great Kublai Khan in Shang-tu near the Pacific Ocean. To get your party safely to Shang-tu, you must know the rules of the Silk Road; the more important ones are noted here:

- Approximately every two months during your trip, you come upon a village that has a market where you may replenish your provisions. As prices vary widely from place to place, it is best to maintain a modest stock of goods so you are not forced to buy at high prices.
- Deciding how well to eat during each two-month period involves some tradeoffs. Eating better allows you to walk longer and cover more ground; you are also less susceptible to disease. However, food costs money (jewels), and your camels have a limited carrying capacity. If you run out of food on the trip, you can always eat a camel (assuming you have one left).
- Balm and unguents are used for treating wounds. If you run out, you face a much higher risk of getting a fatal infection.
- As a merchant, you are not a skilled hunter. However, occasionally you may be offered an opportunity to hunt. Count it a blessing if you get food in this way, but remember that your crossbow is the only weapon you have with which to drive off bandits. Hence, you should always keep a small supply of arrows in reserve.

Many hazards and surprises await you along the road to Shang-tu, so stay alert and keep your wits about you. The Polos completed the land journey in approximately 36 months. In the game, this means arriving at Shang-tu in March 1274. If you make only the best decisions and encounter no delays, it is possible to complete the computer journey in 24 months, but a more realistic goal is to complete the trip in the same 36 months the Polos took. Can you do it?

THE STORY

Today, a traveler flying into Venice, Italy lands at Marco Polo Airport. At the Doge's Palace in Piazza San Marco, one can view magnificent tapestries, porcelain, and jade carvings from China—the rewards of being at the western terminus of the "Silk Road" to the Far East, a route first traveled by Marco Polo in 1271.

Yet upon his return from his now famous journey to the Far East, Marco Polo's tales of strange people and far off places met with disbelief. For hundreds of years, to call something a "Marco Polo" was to label it a tall tale or even an outright falsehood. Even after they were published, his stories were thought to be largely fictional accounts.

Indeed, there is little to indicate that a single one of Marco Polo's contemporaries believed much of his story. And, on his deathbed his friends pleaded with him, for the peace of his soul, to retract some of the incredible statements made in his book. He refused and is said to have replied instead, "I have not told half of what I saw."

As his accounts were set down many years before the development of printing, the volumes were copied by hand, and variations in wording and numerous embellishments crept into the work.

In all, more than 100 different manuscripts were produced—some in Italian, some in Latin, and some in French. The earliest printed edition is dated 1559, but an English translation did not appear until 1818.

Not until the late 1800's did scholars attempt to piece together a truly original edition, as reports from later travelers and explorers began to indicate that the majority of Marco Polo's accounts were accurate and unexaggerated. Unfortunately, not one edition treating the entire work as a travel narrative has ever appeared, nor has the story ever been translated into contemporary English. Thus, to this day, for most Americans, the myths and the realities remain intertwined.

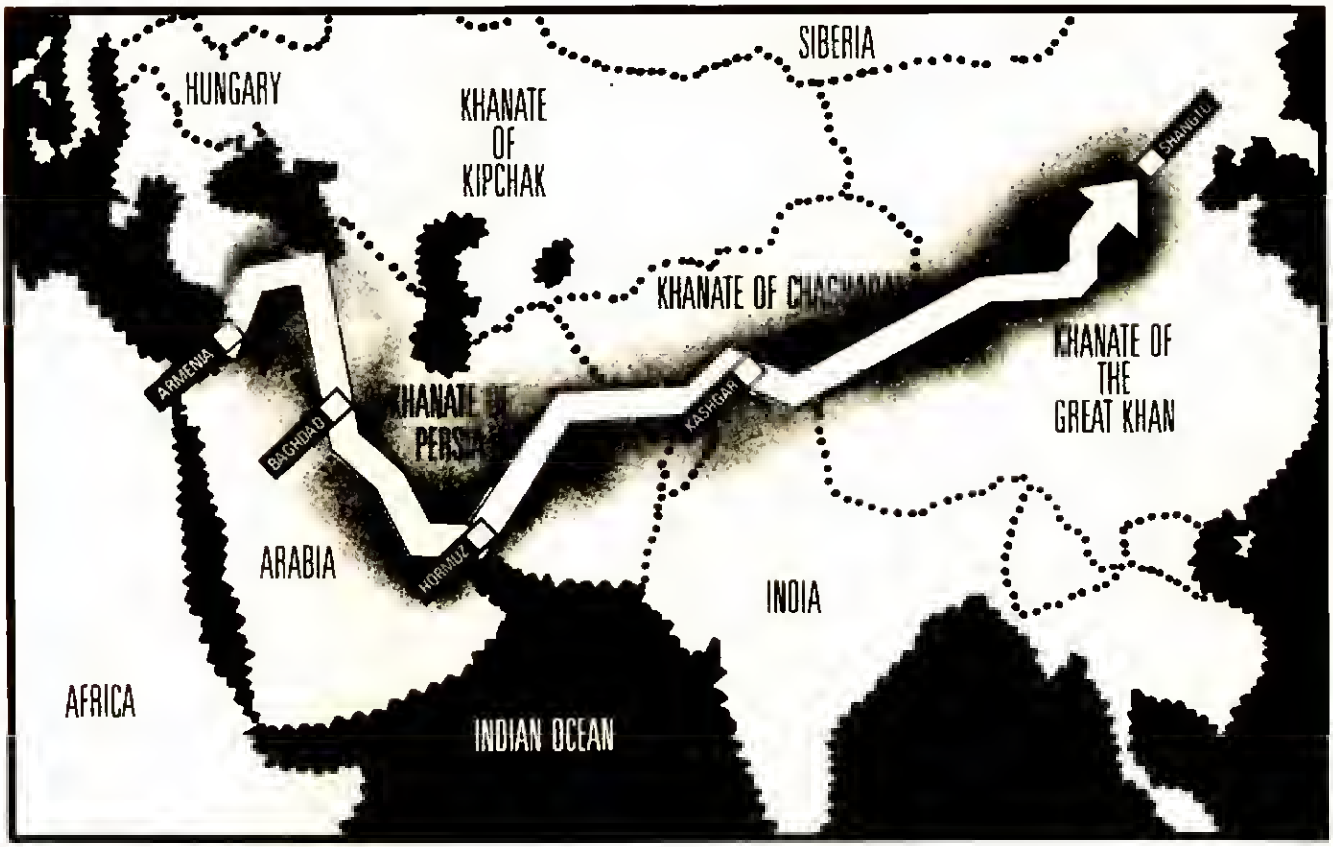
A Family of Adventurers

Marco Polo was born in Venice in 1254, son of Niccolò, one of the great merchants and noblemen of the city. An uncle, Maffeo, worked directly with his father, and together the team of brothers traveled to many distant lands.

Niccolò Polo and his brother Maffeo made their first great journey east in 1260. They visited their third brother in Constantinople and from there set out on a trading trip along the Tigris River to the great city of Bokhara in the Persian Empire (today, the city of Bukhara is in south central Russia). There they met an ambassador of the Great Khan (Supreme Lord), Kublai, son of the conquering Genghis Khan, who lived at the eastern extremity of the continent in Shang-tu (today, the inconsequential town of Shangdu about 200 miles northwest of Beijing, China).

Kublai Khan had never seen a native

By DAVID H. AHL



of Italy and requested an audience with the two brothers. Convinced that they had no choice in the matter, the brothers made an incredible year-long journey across Tibet and Mongolia to the eastern-most part of the empire of the Great Khan (Cathay, or China).

As the first Europeans to set foot in the court of the Great Khan, they were entertained with feasts and plied with extravagant gifts. Kublai Khan questioned the brothers at length and became convinced that his Empire could benefit greatly from European learning (although, it should be mentioned, the Khanates were in many respects better governed and more civilized than much of Europe at that time). Consequently, Kublai Khan asked the brothers to relay to the Pope a request for 100 men of learning who could be stationed throughout this extensive empire to disseminate the best of Western culture.

Although furnished with escorts, provisions, and everything necessary for their return journey, the Polos remained subject to the hazards of travel—extreme cold, floods, deserts, and diseases—and it was three years before they reached the seaport of Laissus in Armenia and set sail for Venice.

Back in Italy, they found that Pope Clement IV had just died.

Many hazards and surprises await ***you along the road to Shang-tu, so stay alert and keep your wits about you.***

The Second Journey

Two years passed before they could relay the Khan's request to the new Pope, Gregory X, who, instead of furnishing 100 men of learning, dispatched two friars of the Order of Preachers to accompany the Polos on their return trip. Having heard accounts of warring tribes along the route, the friars feared for their lives and, after just a few days' journey, turned back.

This was not the only time this happened: as H.G. Wells in *The Outline of History* reports, "This abortive mission was only one of a number of attempts to communicate, and always they were feeble and feeble-spirited attempts, with nothing of the conquering fire of the earlier Christian missions."

Manuel Komroff in *The Travels of Marco Polo* goes further. "A hundred cultured men living in China at this time and returning home at various periods would have changed the course of human events. Europe was just awakening from a long, barbaric sleep, while China was already cultured in many fields. Marco Polo came to exchange merchandise, while 100 cultured men would have returned to exchange ideas. It is the traffic of ideas that is of greater profit to humanity."

On the second journey, the two Polo brothers decided to bring Niccolò's 16-year-old son, Marco, along. Marco was, first and foremost, a merchant, and much of his writing discusses trade, finance, risk, and profit. He also had an eye for nature and described many varieties of birds, trees, and other plants and animals.

But beyond the realms of commerce

and nature he was largely without vision and simply reported what he saw in a matter-of-fact style with little analysis of the underlying whys and wherefores.

The second journey of the Polos resembled the first—the main difference being the eyewitness account provided by young Marco's notes. As mentioned, these notes are not in the form of a travel narrative, but rather a description of things and places. Moreover, in setting down his account, Marco rearranged his notes to tell of a country (or city) and its immediate neighbors, making it difficult to define the actual route taken.

The Route

However, by comparing Marco's accounts with other historical information, excavations, and legends, historians have accurately reconstructed the route of this second legendary journey. Rather than starting in Constantinople, the second journey started in the port of Laissus in Lower Armenia (today, near Adana in south central Turkey). From there the travelers headed northeast along the Euphrates River and then turned southward along the Tigris River to Babylon (Baghdad) and continued on south to the Persian Gulf.

From there they continued south to Hormuz, where the caravan turned almost due north to cross the Dasht-e Lut and Dasht-e Kavir desert regions of Persia to Herat (then in the Khanate of Persia, today in Afghanistan). Next they followed a difficult trek across the mountains of Afghanistan, skirting north of Kashmir to Kashgir, the capital city of the Khanate of Chaghadai (today, Kashi, China).

Continuing in the mountains, the Polos then descended and crossed the narrowest part of the desert of Lop, which took a month. As Marco described, "During these days the journey is invariably over either sandy plains or barren mountains. In this tract, neither beasts or birds are met with, because there is no kind of food for them." He also described "excessive troubles and dangers that must unavoidably be encountered" such as mirages, malevolent spirits, eerie noises, and the danger of losing the path.

This is one of the only places in which Marco Polo discussed the dangers of the route, so it must be supposed that they made a great impression on him. To this day this barren, bone-strewn waste has been crossed by very few travelers, and it remains one of the most desolate regions of the world.

The caravan then continued into the province of Tanguth in the Khanate of the Great Khan along what is today the border of Tibet (Xizang) and Sinkiang (Xinjiang). They continued generally eastward, veering off to the north before reaching Xian, the legendary eastern terminus of the Silk Road. The northern route followed the Yellow River for 550 miles, but unfortunately it also obliged the Polos to cross a portion of the Gobi Desert to reach Shang-tu.

Marco did not dwell as long on the Gobi Desert as he did on the Lop, although he did mention that one must "lay in provisions for at least 40 days because that space of time is employed in traversing the desert, where there is not any appearance of a dwelling, nor are there any inhabitants."

Finally, after traveling for three and a half years, the Polos arrived in the court of the Great Khan and bowed low before the emperor. In place of 100 learned men, they had with them a few letters from the new Pope, a little sacred oil from the Holy Land, and a few items to trade. By this time Marco was 21; the year, 1275.

Marco Polo had observed that *the Khan was often bored by the dry reports of his administrators but enjoyed hearing about the manners and oddities of people in other regions.*

In the Court of the Khan

Kublai Khan took a liking to Marco Polo, who at once applied himself to learning the written and spoken languages of the country. The Emperor, seeing that the young man was both clever and tactful, began to send him on public missions to other parts of the empire.

Marco Polo had observed that the Khan was often bored by the dry reports of his administrators but enjoyed hearing about the manners and oddities of people in other regions. Thus Marco started to keep small notebooks of strange facts that were likely to amuse and interest Kublai Khan. It was from these notebooks that Marco eventually transcribed the account of his travels back in Italy.

The Polos prospered in the court of Kublai Khan, and the Khan became very attached to them. Although they wanted to return to Italy, the Khan apparently felt that in a small way they were serving in place of the 100 men he had requested and declined to let them go.

However, 20 years later the Khan of Persia lost his favorite wife and asked Kublai Khan to send him another from the same Mongol tribe from which she had come. The Polos, who were expert navigators, proposed to the Khan that they be allowed to pilot the ships that would carry the party to Persia. Reluctantly, the Khan consented.

The Polos exchanged all their acquired possessions for jewels and set sail on a long and dangerous two-year voyage through the South China Sea and the Indian Ocean to Persia.

Return to Italy

A year later, after having left the spectacular court of Kublai Khan, Niccolò, Maffeo, and Marco Polo arrived in their old home, Venice. Their clothes were tattered and foreign, their faces reflected the ravages of travel, and they had practically forgotten their native tongue. They had long been thought dead, and the distant relatives occupying their house refused to admit them after their absence of 26 years.

They finally succeeded in convincing their kindred that they were not imposters, and a great feast was arranged. All their old friends and relatives were invited. The Polos dressed in new velvet and damask garments for the meal, but when the table had been cleared and all the servants asked to leave, Marco Polo produced the coarse shabby costumes they had worn on their arrival.

Then taking sharp knives, they ripped the seams and let fall to the table quantities of rubies, sapphires, diamonds, pearls, and other jewels. The guests were amazed and dumbfounded, the story spread, and the Polos became the most illustrious merchants of Venice.

Because the Polos were merchants, they immediately set themselves up in business and again began to trade. At the time, there were fierce rivalries among the great Italian merchant cities of Venice, Pisa, and Genoa. These rivalries had reached the point of open warfare, and most merchant families maintained one or more war galleys to

protect their harbors and trading ships from both pirates and truculent rivals.

In a major battle, the Venetian and Genoese fleets met on September 7, 1298, just three years after the Polos' return from the Far East. In the battle, the Genoese captured the entire Venetian fleet and took 7000 Venetians, including Marco Polo, prisoner. Most were released for ransom, but the Genoese refused to release Marco Polo.

Thus, in a Genoese jail, Marco Polo dictated the notes of his travels to a fellow prisoner, Rusticien, a scribe from Pisa, and they were set down on parchment. Within a year, the merchant war between Venice and Genoa was over, Marco Polo was released, and the world got its first, disbelieving glimpse of the strange and fascinating land of Asia.

THE PROGRAM

The Marco Polo program consists of a very short main program that simply calls a series of ten major subroutines. Ten shorter subroutines perform frequently used operations such as checking for a yes/no answer or centering a printed line.

The initialization section, Lines 100-195, prints the title of the program, sets initial conditions and quantities, prints the rules of the game, and asks you to enter the quantities of camels, food, and oil with which you want to start the game.

In these initial purchases (Lines 720-880) as well as in later purchases made along the route (Lines 1190-1380) you specify quantities of up to six items. These quantities must be within a specific range, the lower limit of which is usually 0. The upper limit is determined by the number of jewels you have to spend. Hence, before each INPUT statement, the upper limit is set:

```
A2=INT(JL/RN)
```

in which A2 is the upper limit, JL is the number of jewels, and RN is the cost of the item. A random function causes the cost to vary slightly.

After the range is set, the INPUT statement requests your response, following which a subroutine (Lines 3790-3820) is called to check whether your response is within the range. If not, a message saying, "That is too few" or "That is too many" is printed, and the input request is repeated.

The main program (Lines 210-340) iterates through the journey in two-month segments. The mileage travelled is calculated in Line 240 after which a check is made on your financial and physical condition. If, for example, you have no jewels, you are given the opportunity to sell a camel (Lines 910-970). If you have contracted an illness or sustained injuries in the last two months, you may not be able to go on until you have stopped to recuperate for a month or more (Lines 1020-1170).

The condition of your camels is also checked. If you have been nursing a wounded animal along, it may have recovered enough to carry a full load.

Every two months, you also get a chance to barter for needed supplies, assuming you have some jewels left. Not having sufficient quantities of supplies may have to diastrous consequences. Food, of course, is essential. In the desert, cooking oil is equally vital, because eating raw food can cause serious illness. Balms are necessary for treating wounds, and arrows are needed to fend off bandits and occasionally to hunt for food.

In the eating subroutine (Lines 1500-1630), you specify how well you wish to eat. Your food reserve is calculated in Line 1580:

```
FR=INT(.5+10*(F-FE))/10
```

Food reserve (FR) equals food (F) less food eaten (FE) and is calculated to $^1/_{10}$ of a bag. This peculiar equation is necessary because the computer does not always calculate fractional values absolutely correctly ($^2/_5$ may come out 0.40000001, for example) and we do not want to print these extraneous digits or, worse yet, compound the error as the program proceeds. Because the integer (INT) function actually truncates the decimal places, it is necessary to add 0.5 to ten times the number to retain the correct decimal value.

Another interesting expression is found in Line 2160:

```
IF FC=1 THEN X$="" ELSE
  X$="s"
```

This is used when printing the reference to an item, in this case sacks of food, that can have a value of 0, 1, or more. When printing, we want the singular or plural form of the item to correspond to the numeric value, i.e., "1 sack" and "2 sacks." Thus, the PRINT statement uses the string X$ as follows:

```
PRINT "You'll have to sell"
    FC "sack" X$ " of food . . .
```

Notice the spacing. When a numeric value (FC) is printed, it is automatically preceded and followed by a space; thus, we enclose no spaces in the quotes on either side of the numeric value. However, a string (X$) has no automatic spaces, and because we want a space following the word sack or sacks, we leave a space inside the quotes following X$.

The longest subroutine (Lines 1940-2820) deals with hazards and special events. The probability of the occurrence of each event is determined by the series of numbers in the DATA statement in Line 3580:

```
3580 DATA 6,4,4,6,6,6,6,4,4,
     1,6,8,18,10
```

The probability of the first event (injured camel) is arbitrarily set to 6. The next event (sick camel) is only two thirds as likely to happen as the first; it is assigned a value of 4. The 13th event (possible illness from not eating enough) is three times as likely to happen as the first; it is assigned a value of 18.

The cumulative value of these events is then read into the array EP. EP(1)=6, EP(2)=6+4 or 10, EP(3)=14, and so on. The function in Line 1950 determines which event occurs:

```
RN=INT(EPT*RND(1))
```

The function selects a value between 1 and EPT. If RN is between 1 and 6, event 1 occurs; between 6 and 10, event 2; between 10 and 14, event 3; and so on.

Reader Challenge

Unfortunately, ST Basic does not have direct access to the realtime clock of the computer, so the shooting subroutine does not work as it was originally written in Microsoft Basic.

A three-year subscription or extension to *Atari Explorer* goes to the first reader who writes an acceptable substitute for the shooting timer routine. This is how it works in Microsoft Basic:

At the beginning of the game (Lines 600-700), you are asked to rank your shooting ability which is entered in the variable HX. Since the program cannot really test your prowess with the crossbow, shooting ability is measured by how fast you can type a random shooting sound.

In the shooting subroutine (Lines 3620-3700), first a random shooting word is selected for you to type in Line 3630. Then, the current or starting time (S1) is read from the realtime clock in Line 3640. An INPUT statement in Line 3650 accepts your typed word, which is then compared with the requested word. If the two words match, the ending time (S2) is read from the realtime clock in Line 3670, the starting time is subtracted from it, and the resulting elapsed time is used to calculate your ability as a marksman.

In ST Basic, how well you shoot in a given situation is simply calculated as a random function in Line 3695. Can you come up with a better approach?

Save Time Typing

If you don't have time to type in the Marco Polo program, I will furnish the program on a single sided 3.5″ disk readable on either a 520ST or 1040ST for $5.00 postpaid. If you would like to purchase the book *Basic Computer Adventures* which includes Marco Polo and nine other travel adventure simulations (Westward Ho, Amelia Earhart, Appalachian Trail, Subway Scavenger, Orient Express, and others) in Microsoft Basic (reasonably easily converted to ST Basic), send $10.00.

To order the disk, book, or both, send your check or money order (no credit card, COD, or billed orders) to David Ahl, 12 Indian Head Rd., Morristown, NJ 07960. ■

SAMPLE OUTPUT

```
Blood-thirsty bandits are attacking your small caravan!
You grab your crossbow...Type: TWACK  ? twack
With practice you could shoot the crossbow, but most of your shots
missed.  An iron mace got you in the chest.  They took some jewels.
You use 2 bottles of balm treating your wound.

Date: March 1273
You have traveled 3017 miles.
You should try to replace that tent you have been wearing as a
robe.  It is badly torn and the Tartars find it insulting.

A gash in your leg looks infected.  It hurts like the blazes.
You need more unguent to treat your wound.
Fortunately, you find some nomads who offer to sell you 2 bottles
of unguent for the outrageous price of 4 jewels each.
Do you want to buy it? 2
Don't understand answer.  Enter 'Y' or 'N' please? y
It works well and you're soon feeling better.

                ••••••••••••••••••••••••••••••••••••

Date: July 1275
You have traveled 5469 miles.
You have only 7 jewels with which to barter.
You push on with your 2 camels.
You have 7 jewels.  Do you want to barter here? n

Here is what you now have:
                    Sacks of Skins of Robes and  Balms and  Crossbow
Jewels    Camels      Food      Oil     Sandals    Unguents   Arrows
   7         2         0.0       1.0        2          0         11

You don't have enough food to go on.
Do you want to eat a camel? y
You manage to get about 4 sacks of food out of it.
On the next stage of your journey, how do you want to eat:
 (1) Reasonably well (can walk further; less chance of sickness)
 (2) Adequately, or (3) Poorly? 3
Your food reserve is now just 1 sack.

You are in the Gobi (Cathay) desert.
You ran out of oil for cooking.
You got horribly sick from eating raw and undercooked food.
You get a nasty burn from an oil fire.
You need more balm to treat your wound.
But, alas, you don't have enough jewels to buy any.
```

PROGRAM VARIABLES

A	Answer to input query, numeric
A$	Answer to input query, string
A1, A2	Upper and lower limit to input answer
B	Beasts (camels)
BA	Beast quality
BL	Beast load capacity
BSK	Beast sickness indicator
C	Clothes (changes)
CZ	No clothes indicator
D	Distance (miles per trip segment)
DT	Distance, total
DZ	Desert indicator
EP(n)	Event probabilities (n=1,14)
F	Food (sacks)
FA$(n)	Food, names of animals for hunting
FC	Food carrying capacity of beast
FE	Food eaten on current trip segment
FP	Food eaten on previous trip segment
FQ	Food quality on current and previous trip segments
FR	Food reserve
HX	Hunting expertise level
I	Iteration variable
J	Trip segments (2-month periods)
K	Iteration variable
JL	Jewels
L	Oil (skins)
M	Medicines (bottles of balm)
MO	Month
MO$(n)	Month name (n=−1,6)
PFD	Person food indicator
PSK	Person sickness indicator
PSKT	Person sickness total
PWD	Person wound indicator
PWDT	Person wounds total
R	Rate of speed
RN	Random number variable
S$(n)	Shooting words (n=1,4)
S1, S2	Shooting timer start and stop
SR	Shooting response
W	Weapons (crossbow arrows)
X$	Temporary string variable
XA$	Temporary string variable
YR	Year

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MARCO POLO

ATARI KEY

- Any Atari ST Computer
- ST Basic

Notice

Marco Polo is one of ten travel simulations included in the book *Basic Computer Adventures* by David Ahl, published by Microsoft Press, and is reprinted with permission.


```
100   CLEAR : CLEARW 2 : FULLW 2
110   GOTOKY 0,5 : X$="The Journey of Marco Polo, 1271" : GOSUB 3760
120   PRINT : PRINT : K$="(c) David H. Ahl, 1987" : GOSUB 3760
130   GOTOKY 0,17 : GOSUB 3720 : CLEARW 2
140   DIM EP(20)
150   JL=300 : C=2 : W=30 : M=5 : FP=5 : BSK=99 : 'Initial quantities of stuff
160   GOSUB 360 : GOSUB 3560 : 'Display the acenario
170   WHILE RN>32767 : RN=RN-65535! : WEND : RANDOMIZE RN
180   PRINT : GOSUB 720 : 'Purchaae initial supplies
190   GOSUB 600 : 'Input hunting skill level
195   K$="Press the spacebar to begin your trek!" :GOSUB 3760 :GOSUB 3740 :PRINT
200   '
210   'Main program
220   J=J+1 : GOSUB 3510 : 'Next two-month aegment
230   DT=DT+D : IF DT>6000 THEN 3360 : 'Reached end of trip?
240   D=40+BA*20+INT(100*RND(1)) : PRINT "You have traveled" DT "miles."
245   PRINT "Here ia what you now have:" : GOSUB 3200
250   GOSUB 910 : 'Check for no jewels or clothes
260   GOSUB 1020 : 'Check for sickness
270   IF BSK=J THEN BSK=99 : BL=B : BA=BA+1 : 'Camel recover yet?
275   GOSUB 2140 : 'Check for overloaded camels
280   IF J>1 AND JL>1 THEN GOSUB 1190 : 'Barter for supplies
290   IF C=0 THEN GOSUB 1400 : 'No clothes?
300   GOSUB 1500 : 'Eating routine
310   IF DZ=0 AND RND(1)<.18 THEN GOSUB 3020 : '18% chance to hunt for food
320   PRINT : GOSUB 1780 : 'Deaert aections
330   IF DZ=0 THEN GOSUB 1940 : 'Event happens
340   GOSUB 3110 : GOTO 220
350   '
360   'Subroutine to print initial scenario
370   K$="The Journey of Marco Polo - 1271" : GOSUB 3760 : PRINT : PRINT
380   PRINT "     Starting from Venice in 1271 you travel by sailing ship to the"
390   PRINT "port of Armenia.  Upon arrival, you prepare for a 6000-mile trek to"
400   PRINT "the court of the Great Kublai Kahn in Shang-tu, Cathay.  Having set"
410   PRINT "aside" JL "precious jewels to finance your planned 3-year trip, you"
420   PRINT "must barter for the following suppliea in Armenia:"
450   PRINT " * Camels (Sturdier animals will coat more.  You will probably"
460   PRINT "     want 8 to 10 camels to carry your many supplies.)"
470   PRINT " * Food (You must barter for food as you travel along.  However,"
480   PRINT "     prices tend to be lower in port cities, ao you should pack"
490   PRINT "     in s good supply at the start.)
500   PRINT " * Oil for lamps and cooking (Over much of the trip, you will be"
510   PRINT "     able to use wood to build fires.  However, in the Persian,"
520   PRINT "     Lop, and Gobi deserts you will need oil.)" : PRINT
521   GOSUB 3720
522   PRINT "     From Venice you have also packed clothing, weapons (crossbows),"
524   PRINT "and medicines (balms and unguents), however, your provisions will be"
530   PRINT "depleted as you go along and you must replenish them.  The selection"
540   PRINT "and price of suppliea ia quite different in various regions, ao you"
550   PRINT "must barter wiaely.  As a merchant, you are not skilled in fishing"
560   PRINT "or hunting, although occasionally you might be sble to try to get"
570   PRINT "to get some food in this way."
580   PRINT : RETURN
590   '
600   'Subroutine to initialize hunting skill level
610   S$(1)="SPLAT" : S$(2)="SPRONG" : S$(3)="TWACK" : S$(4)="ZUNK"
620   FA$(1)="wild boar" : FAS(2)="big stag" : FA$(3)="black bear"
622   'Shooting rating only works with Microaoft Basic
625   PRINT : PRINT "Before you begin your journey, pleaae rank your skill with"
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630   PRINT "the crossbow on the following scale:"
640   PRINT "    (1) Can hit a charging boar at 300 paces"
650   PRINT "    (2) Can hit a deer at 50 paces"
660   PRINT "    (3) Can hit a sleeping woodchuck at 5 paces"
670   PRINT "    (4) Occasionally hit own foot when loading
680   INPUT "How do you rank yourself";HX
690   IF HX>0 AND HX<5 THEN PRINT : RETURN
700   PRINT "Please enter 1, 2, 3, or 4" : GOTO 680
710   '
720   'Subroutine to get initial supplies
730   PRINT "      After three months at sea, you have arrived at the seaport of"
740   PRINT "Laiassus, Armenia.  There are many merchants in the port city and"
750   PRINT "you can easily get the supplies you need.  Several traders offer you"
760   A1=17 : A2=24 : PRINT "camels at prices between" A1 "and" A2 "jewels each."
770   INPUT "How much do you want to pay for a camel";A : GOSUB 3790 : BA=A
780   PRINT "You will need at least 7 camels, but not more than 12."
790   A1=7 : A2=12 : INPUT "How many camels do you want to buy";A : GOSUB 3790
800   B=A : JL=JL-BA*B : A2=3*B-6 : 'Camels--number, cost, amount they can carry
810   PRINT "      One large sack of food costs 2 jewels.  You will need at least"
820   PRINT "8 sacks to get to Babylon (Baghdad); you can carry a maximum of" A2
830   A1=8 : INPUT "sacks.  How many do you want";A : GOSUB 3790
840   F=A : JL=JL-A*2 : A2=3*B-A : 'Food & cost, amount of oil camels can carry
850   PRINT "      A skin of oil costs 2 jewels each.  You should have at least 6"
860   PRINT "full skins for cooking in the desert.  Your camels can carry" A2
870   A1=5 : INPUT "skins.  How many do you want";A : GOSUB 3790
880   BL=B : L=A : JL=JL-2*L : 'Oil--amount and cost : return
900   '
910   'Subroutine to check for being out of jewels and clothes
920   IF JL>15 THEN 980 : 'Still have a few jewels?
930   PRINT "You have only" JL "jewels with which to barter." : IF B>2 THEN 950
940   PRINT "You push on with your" B "camels." : RETURN
950   INPUT "Would you like to sell a camel";AS : GOSUB 3840 : IF AS="N" THEN 940
960   RN=INT(8+9*RND(1)) : PRINT "You get" RN "jewels for your best camel."
970   JL=JL+RN : B=B-1 : BL=BL-1 : 'Add jewels, subtract camel
980   IF C>0 THEN RETURN : 'Have some clothes?
990   PRINT "You should try to replace that tent you have been wearing as a"
1000  PRINT "robe.  It is badly torn and the Tartars find it insulting." : RETURN
1010  '
1020  'Subroutine to deal with sickness
1030  IF PSK>0 THEN PSKT=PSKT+PSK : PSK=0 : 'Sickness total
1040  IF PWD>0 THEN PWDT=PWDT+PWD : PWD=0 : 'Injuries total
1050  IF FE=3 THEN PFD=PFD+.4
1060  IF PSKT+PWDT+PPD<3 THEN RETURN
1070  IF RND(1)>.7 THEN RETURN : '70% chance of delay due to recurring illness
1080  PRINT "As a result of sickness, injuries, and poor eating, you must stop"
1090  PRINT "and regain your health.  You trade a few jewels to stay in a hut."
1100  RN=INT(1+3.2*RND(1)) : IF RN>3 THEN 1160 : '6% chance of dying
1110  PRINT "You grow steadily stronger, but it is" RN*2 "months until you"
1120  PRINT "are again fit to travel." : PSKT=0 : PWDT=0 : PFD=0 : J=J+RN
1130  M=INT(M/2) : P=P/2 : IP P<3 THEN F=3
1140  IF JL>20 THEN JL=JL-10 ELSE JL=INT(JL/2) : 'Costs money for lodging
1150  GOSUB 3510 : RETURN
1160  FOR I=1 TO 2500 : NEXT : PRINT "You stay for" RN "months but grow"
1170  PRINT "steadily weaker and finally pass away." : J=J+RN : GOTO 3320
1180  '
1190  'Subroutine to barter for supplies
1200  PRINT "You have" JL; : INPUT "jewels.  Do you want to barter here";A$
1210  GOSUB 3840 : IP A$="N" THEN 1380
1220  RN=INT(17+8*RND(1)) : PRINT "Camels cost" RN "jewels here.  ";
1230  A1=0 : A2=INT(JL/RN) : INPUT "How many do you want";A : GOSUB 3790
1240  B=B+A : BL=BL+A : BA=BA-A : 'Lower quality animals along route
1250  JL=JL-A*RN : RN=INT(2+4*RND(1)) : PRINT "Sacks of food cost" RN "jewels. ";
1260  A2=(INT(JL/RN)) : INPUT "How many do you want";A : GOSUB 3790 : F=F+A
1270  IF F+L>3*BL THEN PRINT "Camels can't carry that much." : F=F-A : GOTO 1260
1280  JL=JL-A*RN : RN=INT(2+4*RND(1)) : PRINT "Skins of oil cost" RN "jewels.  ";
1290  A2=(INT(JL/RN)) : INPUT "How many do you want";A : GOSUB 3790 : L=L+A
1300  IP F+L>3*BL THEN PRINT "Camels can't carry that much." : L=L-A : GOTO 1290
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1310  JL=JL-A*RN : RN=INT(8+8*RND(1)) : PRINT "A set of clothes costs" RN;
1320  A2=(INT(JL/RN)) : INPUT "jewels.  How many do you want";A : GOSUB 3790
1330  C=C+A : JL=JL-A*RN : PRINT "You can get a bottle of balm for 2 jewels.  ";
1340  A2=JL/2 : INPUT "How many do you want";A : GOSUB 3790 : JL=JL-2*A : M=M+A
1350  A2=JL : RN=INT(6+6*RND(1)) : PRINT "You can get" RN "arrows for 1 jewel."
1360  INPUT "How many jewels do you want to spend on arrows";A : GOSUB 3790
1370  JL=JL-A : W=W+RN*A : IF C>1 THEN CZ=0
1380  PRINT : PRINT "Here is what you now have:" : GOSUB 3200 : RETURN
1390  '
1400  'Subroutine to deal with no clothes
1410  PRINT : PRINT "You were warned about getting more modest clothes."
1420  PRINT "Furthermore, your sandals are in shreds." : IF CZ=1 THEN 1470
1430  PRINT "The Tartars chase you from town and ";
1440  IF RND(1)>.2 THEN PRINT "warn you not to return." : CZ=1 : RETURN
1450  PRINT "stone you." : PRINT "You are badly wounded and vow to get ":
1460  PRINT "new clothes as soon as possible." : PWD=1.5 : CZ=1 : RETURN
1470  PRINT "Word has been received about your disreputable appearance.
1480  PRINT "The people are not willing to deal with you and they "; : GOTO 1450
1490  '
1500  'Subroutine to eat
1510  IF F<3 THEN GOSUB 1650 : 'Out of food?
1520  PRINT "On the next stage of your journey, how do you want to eat:"
1530  PRINT " (1) Reasonably well (can walk further; less chance of sickness)"
1540  INPUT " (2) Adequately, or (3) Poorly";A : IF A>0 AND A<4 THEN 1560
1550  PRINT "That's not a choice.  Now then, (1) Well,"; : GOTO 1540
1560  FE=6-A : IF FE<=F THEN 1580
1570  PRINT "You don't have enough food to eat that well.  Try again.": GOTO 1520
1580  FR=INT(.5+10*(F-FE))/10 : IF FR>3 THEN 1630
1590  IF FR=1 THEN X$="" ELSE X$="s"
1600  PRINT "Your food reserve will then be just" FR "sack" X$ : IF A=3 THEN 1630
1610  INPUT "Do you want to change your mind about how much you will eat";A$
1620  GOSUB 3840 : IF A$="Y" THEN 1520
1630  F=F-FE : D=D-(A-1)*50 : FQ=FP+FE : FP=FE : RETURN
1640  '
1650  'Out of food section
1660  PRINT "You don't have enough food to go on."
1670  IF JL<15 THEN 1730
1680  PRINT "You should have bought food at the market.  Now it will cost you"
1690  RN=INT(5+4*RND(1)) : PRINT RN "jewels per sack."; : A1=1 : A2=(INT(JL/RN))
1700  INPUT "  How many sacks do you want";A : GOSUB 3790
1710  F=P+A : JL=JL-A*RN : IF F>=3 THEN RETURN
1720  PRINT "You still don't have enough food and there is nothing to hunt."
1730  IF B<1 THEN 1760 ELSE INPUT "Do you want to eat a camel";A$
1740  GOSUB 3840 : IF A$="N" THEN 3280 ELSE B=B-1 : RN=INT(3+2*RND(1)) : F=F+RN
1750  PRINT "You manage to get about" RN "sacks of food out of it." : RETURN
1760  PRINT "You don't even have a camel left to eat." : GOTO 3280
1770  '
1780  'Subroutine for desert sections
1790  DZ=0 : IF DT<2100 OR DT>5900 THEN RETURN : 'No desert at far ends
1800  IF DT>2600 AND DT<4100 THEN RETURN : 'Tigris River Valley
1810  IF DT>4600 AND DT<5400 THEN RETURN : 'No desert in middle
1820  IF DT<4100 THEN X$="Dasht-e-Kavir (Persian)" : GOTO 1840
1830  IF DT>5399 THEN X$="Gobi (Cathay)" ELSE X$="Taklimakan (Lop)"
1840  PRINT "You are in the " X$ " desert."
1850  IF L>=3 THEN L=L-3 : PRINT "Use 3 skins of oil for cooking." : GOTO 1900
1860  PRINT "You ran out of oil for cooking."
1870  IF L>1 THEN IF RND(1)>.5 THEN L=0 : GOTO 1900
1880  PRINT "You get horribly sick from eating raw and undercooked food."
1890  L=0 : PSK=1 : D=D-80 : M=M-1
1900  ON INT(1+7*RND(1)) GOSUB 2250,2310,2420,2450,2480,2510,1920
1910  DZ=1 : GOSUB 3110 : RETURN
1920  PRINT "You got through this stretch of desert without mishap!" : GOTO 1910
1930  '
1940  'Subroutine to deal with special events
1950  RN=INT(EPT*RND(1)) : FOR I=1 TO 14 : 'Iterate thru possible events
1960  IF RN<=EP(1) THEN 1970 : 'If event happened, exit loop
1965  NEXT I : I=14
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1970  IF I>10 THEN 1990
1980  ON I GOTO 2000,2250,2310,2340,2360,2380,2400,2420,2450,2480
1990  ON I-10 GOTO 2540,2570,2600,2660
2000  PRINT "A camel injures its leg.  Do you want to (1) Nurse it along or"
2010  INPUT "(2) Abandon it, or (3) Sell it";A
2020  IF A=1 THEN 2040 ELSE IF A=2 THEN 2050 ELSE IF A=3 THEN 2090
2030  FRINT "That is not a choice.  Answer (1) to Nurse it along, " : GOTO 2010
2040  BSK=J+2 : GOSUB 2120 : RETURN
2050  B=B-1 : GOSUB 2120 : FC=3*BL-F-L : IF FC<=0 THEN RETURN
2060  FRINT "You kill the camel for food." : IF FC>2 THEN FC=3
2070  F=F+FC : IF FC=1 THEN X$="" ELSE XS="s"
20B0  PRINT "You get the equivalent of" FC "sack" XS " of food." : RETURN
2090  B=B-1 : FRINT "It is a poor beast and you can get only 10 jewels for it."
2100  JL=JL+10 : GOSUB 2120 : RETURN
2110  '
2120  'Exceed load carrying capacity of camels?
2130  BL=B : IF BSK<=J THEN BL=B-.6 : BA=BA-1 : 'If sick camel reduce load, speed
2140  IF F+L<=3*BL THEN RETURN
2150  PRINT "You have too large a load for your camels." : FC=INT(F+L-3*BL+.9)
2160  IF FC=1 THEN X$="" ELSE XS="s"
2170  FRINT "You'll have to sell" FC "sack" XS " of food or skin" XS " of oil."
2180  FS=INT(FC/2) : LS=FC-FS : 'How much to sell of food and oil
2190  IF LS>L THEN LS=LS-1 : FS=FS+1 : GOTO 2190
2200  IF FS>F THEN FS=FS-1 : LS=LS+1 : GOTO 2200
2210  F=F-FS : L=L-LS : JL=JL+FS+LS : 'Decrease food and oil, add jewels
2220  PRINT "You sell" FS "of food," LS "of oil for which you get only";
2230  PRINT FS+LS "jewel" XS "." : RETURN
2240  '
2250  PRINT "One of your camels is very sick and can't carry a full load."
2260  INFUT "Want to (1) Keep it with you, (2) Slaughter it, or (3) Sell it";A
2270  IF A=1 THEN 2290 ELSE IF A=2 THEN 2050 ELSE IF A=3 THEN 2090
22B0  FRINT "That is not a choice.  Again, please." : GOTO 2260
2290  BSK=J+2 : GOSUB 2120 : RETURN
2300  '
2310  PRINT "Long stretch with bad water.  Costs time to find clean wells."
2320  D=D-50 : RETURN
2330  '
2340  FRINT "You get lost trying to find an easier route." : D=D-100 : RETURN
2350  '
2360  FRINT "Heavy rains completely wash away the route." : D=D-90 : RETURN
2370  '
2380  FRINT "Some of your food rots in the humid weather." : F=F-1 : RETURN
2390  '
2400  PRINT "Marauding animals got into your your food supply." : F=F-1 : RETURN
2410  '
2420  FRINT "A fire flares up and destroys some of your food and clothes."
2430  F=F-.4 : C=C-1 : GOSUB 3110 : IF L<1 THEN RETURN ELSE L=L-.5 : RETURN
2440  '
2450  PRINT "Two camels wander off.  You finally find them after spending"
2455  FRINT "several days searching for them."
2460  D=D-20 : RETURN
2470  '
2480  FRINT "You get a nasty burn from an oil fire."
2490  PWD=.5 : GOSUB 2840 : RETURN
2500  '
2510  FRINT "High winds, sand storms, and ferocious heat slow you down."
2520  D=D-70 : RETURN
2530  '
2540  FRINT "A gash in your leg looks infected.  It hurts like the blazes."
2550  GOSUB 2840 : D=D-50 : FWD=.7 : RETURN
2560  '
2570  FRINT "Jagged rocks tear your sandals and clothing.  You'll have to get"
2580  FRINT "replacements as soon as you can." : C=C-1 : D=D-30 : RETURN
2590  '
2600  RN=RND(1)*FQ : IF RN<2 THEN 2610 ELSE IF RN<3.5 THEN 2630 ELSE RETURN
2610  PRINT "All of you have horrible stomach cramps and intestinal disorders"
2620  FRINT "and are laid up for over a month." : D=D-275 : RETURN
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2630  PRINT "You're running a high fever and your muscles feel like jelly."
2640  PRINT "Your party slows down for you." : PSK=.7 : D=D-125 : RETURN
2650  '
2660  PRINT "Blood-thirsty bandits are attacking your small caravan!"
2670  PRINT "You grab your crossbow..."; : GOSUB 3620
2680  IF W>5 THEN 2700 ELSE PRINT "You try to drive them off, but you ran out"
2690  PRINT "of arrows.  They grab some jewels and food." : F=F-1 : GOTO 2720
2700  IF SR<=1 THEN 2810 ELSE IF SR<=3 THEN 2780
2710  PRINT "Better stick to trading; your aim is terrible."
2720  IF RND(1)>.8 THEN 2750 : '80% chance of surviving attack
2730  PRINT "They are savage, evil barbarians -- they kill you and take"
2740  PRINT "your remaining camels and jewels." : JL=0 : B=0 : GOTO 3320
2750  PRINT "You caught a knife in the shoulder.  That's going to take quite"
2760  PRINT "a while to heal.": GOSUB 2840
2770  PWD=1.5 : JL=JL-10 : W=W-4-2*SR : GOSUB 3110 : RETURN
2780  PRINT "With practice you could shoot the crossbow, but most of your shots"
2790  PRINT "missed.  An iron mace got you in the chest.  They took some jewels."
2800  PWD=1 : JL=JL-5 : GOSUB 2840 : W=W-3-2*SR : GOSUB 3110 : RETURN
2810  PRINT "Wow!  Sensational shooting.  You drove them off with no losses."
2820  W=W-4 : RETURN
2830  '
2840  'Subroutine to deal with using balm
2850  RN=INT(1+2*RND(1)) : IF RN>1 THEN X$="s" ELSE X$=""
2860  IF RND(1)>.5 THEN XA$="balm" ELSE XA$="unguent"
2870  M=M-RN : IF M<0 THEN M=0 : GOTO 2890
2880  PRINT "You use" RN "bottle" XS " of " XA$ " treating your wound." : RETURN
2890  PRINT "You need more " XA$ " to treat your wound." : IF JL<8 THEN 2940
2900  PRINT "Fortunately, you find some nomads who offer to sell you 2 bottles"
2910  PRINT "of " XA$ " for the outrageous price of 4 jewels each."
2920  INPUT "Do you want to buy it";A$ : GOSUB 3840 : IF A$="N" THEN 2950
2930  PRINT "It works well and you're soon feeling better.": M=0: JL=JL-8: RETURN
2940  PRINT "But, alas, you don't have enough jewels to buy any."
2950  PRINT "Your wound is badly infected, "; : IF RND(1)<.8 THEN 3000
2960  PRINT "but you keep going anyway." : PRINT
2970  PRINT "Unfortunately, the strain is too much for you and, after weeks of"
2980  PRINT "agony, you succumb to your wounds and die in the wilderness."
2990  GOTO 3320
3000  PRINT "but you push on for the next village." : PWD=3 : RETURN
3010  '
3020  'Subroutine to hunt for food
3030  IF W<15 THEN PRINT "You don't have enough srrows to hunt for food.": RETURN
3040  PRINT "There goes a " FA$(INT(1+3*RND(1))) "..."; : W=W-15 : GOSUB 3620
3050  IF SR<=1 THEN 3080 ELSE IF SR<=3 THEN 3070
3060  PRINT "Were you too excited?  All your shots went wild." : RETURN
3070  PRINT "Not bad; you finally brought one down." : FA=2 : GOTO 3090
3080  PRINT "With shooting that good, the Kahn will want you in his army." : FA=3
3090  PRINT "Your hunting yields" FA "sacks of food." : F=F+FA : RETURN
3100  '
3110  'Subroutine to check for zero quantities
3120  IF JL<0 THEN JL=0 : 'Can't have negative jewels
3130  IF F<0 THEN F=0 : 'or food
3140  IF L<0 THEN L=0 : 'or oil
3150  IF C<0 THEN C=0 : 'or clothing
3160  IF M<0 THEN M=0 : 'or medicine
3170  IF W<0 THEN W=0 : 'or arrows
3180  RETURN
3190  '
3200  'Subroutine to print inventory
3210  PRINT TAB(20) "Sacks of   Skins of   Robes and  Balms and  Crossbow"
3220  PRINT "Jewels     Camels    Food        Oil       Sandals    ";
3230  PRINT "Unguents   Arrows" : GOSUB 3110
3240  PRINT USING "####";JL; : X$="###########" : XA$="########.#"
3250  PRINT USING X$;B; : PRINT USING XA$;F; : PRINT USING XA$;L;
3260  PRINT USING X$;C; : PRINT USING X$;M; : PRINT USING XS;W : PRINT : RETURN
3270  '
3280  'End game - out of food
3290  PRINT "You keep going as long as you can, trying to find berries and"
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3300  PRINT "edible plants.  But this is barren country and you fall ill and,"
3310  PRINT "after weeks of suffering, you collapse into eternal sleep."
3320  PRINT : J=J+1 : GOSUB 3510 : PRINT "You had the following left at the end:"
3330  GOSUB 3200 : PRINT "You traveled for" J*2 "months!"
3340  PRINT : PRINT "Sorry, you didn't mske it to Shang-tu." : GOTO 3490
3350  '
3360  'End of trip section
3370  GOSUB 3110 : 'Can't have negative jewels at end
3380  FOR I=1 TO 3000 : NEXT I : CLEARW 2 : FOR I=1 TO 10
3390  X$="CONGRATULATIONS !" : GOTOXY 12,1 : GOSUB 3760
3400  FOR K=1 TO 100 : NEXT K : CLEARW 2 : FOR K=1 TO 50 : NEXT K : NEXT I
3410  CLEARW 2 : GOSUB 3510 :PRINT "You have been traveling for" J*2 "months!" :
3420  PRINT "You are ushered into the court of the Great Kublai Kahn."
3430  PRINT "He surveys your meager remaining supplies:" : GOSUB 3200
3440  PRINT "... and marvels that you got here at all.  He is disappointed"
3450  PRINT "that the Pope did not see fit to send the 100 men of learning"
3460  PRINT "that he requested and, as a result, keeps the three of you as"
3470  PRINT "his personal envoys for the next 21 years.  Well done!" : PRINT
3480  '
3490  PRINT : INPUT "Would you like to try again";A$ : GOSUB 3840
3500  IF A$="Y" THEN GOTO 100 ELSE END
3505  '
3510  'Subroutine to print the date
3520  MO=J : WHILE MO>6 : MO=MO-6 : WEND
3530  YR=1271+INT(J/6)
3540  PRINT : PRINT "Date: " MO$(MO) YR : RETURN
3550  '
3560  'Subroutine to read event probabilities
3570  FOR I=1 TO 14 : REAO A : EPT=EPT+A : EP(I)=EPT : NEXT I
3580  DATA 6,4,4,6,6,6,6,4,4,1,6,8,18,10
3590  FOR I=1 TO 6 : READ MO$(I) : NEXT I : RETURN
3600  DATA "March","May","July","September","November","January"
3610  '
3620  'Subroutine to shoot crossbow
3630  RN=1+INT(4*RNO(1)) : 'Print random shooting word
3635  'Timer in lines 3640, 3680, & 3690 works with Microsoft Basic only
3640  S1=60*VAL(MID$(TIME$,4,2))+VAL(RIGHT$(TIME$,2)) : 'Start timer
3650  PRINT "Type: " S$(RN) "  "; : INPUT X$ : IF X$=S$(RN) THEN 3680
3655  IF LEN(X$)=0 THEN 3700
3660  FOR I=1 TO LEN(X$) : 'Iterate through letters for possible lower case
3670  IF MID$(S$(RN),I,1)<>CHR$(ASC(MIO$(X$,I,1))-32) THEN 3700
3675  NEXT I
3680  S2=60*VAL(MID$(TIME$,4,2))+VAL(RIGHT$(TIME$,2)) : 'End timer
3690  SR=S2-S1-HK : 'Shooting response
3695  SR=3.5*RND : RETURN : 'Shooting response is random in Atari ST Basic
3700  PRINT "That's not it.  Try again.  "; : GOTO 3650
3710  '
3720  'Subroutine to hit continue key
3730  X$="Press the spacebsr to continue." : GOSUB 3760
3740  WHILE INP(-2)=0 : RN=RN+1 : WEND : RETURN
3750  '
3760  'Subroutine to print a centered line
3770  PRINT TAB((70-LEN(X$))/2) X$; : RETURN
3780  '
3790  'Subroutine to check if answer entered in is range
3800  IF A>=A1 AND A<=A2 THEN RETURN
3810  IF A<A1 THEN X$="few" ELSE X$="many"
3820  PRINT "That is too " X$; : INPUT ".  Your answer please";A : GOTO 3800
3830  '
3840  'Subroutine to process a yes/no answer
3850  GOSUB 3880 : IF A$="Y" OR A$="N" THEN RETURN
3860  INPUT "Don't understand answer.  Enter 'Y' or 'N' please";A$ : GOTO 3850
3870  '
3880  'Subroutine to extract the first letter of an answer
3890  IF A$="" THEN A$="Y" : RETURN
3900  A$=LEFT$(A$,1) : IF A$>="A" AND A$<="Z" THEN RETURN
3910  A$=CHR$(ASC(A$)-32) : RETURN
```

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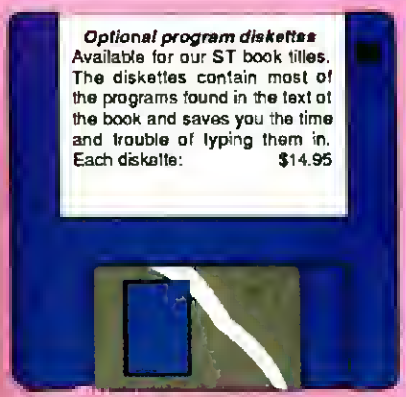

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